THE ATHENÆUM

Journal of English and Foreign Literature, Science, and the Fine Arts.

No. 1769. LONDON, SATURDAY, SEPTEMBER 21, 1861. PRICE FOURPENCE Stamped Edition, 5d.

THE FEMALE SCHOOL OF ART, 43, QUEEN-SQUARE, BLOOMSBURY, in connexion with the Science and Art Department.—The AUTUMN SESSION will COMMENCE on the 1st of October. Classes for Geometry, Perspective, Model Drawing, Fruit and Flowers from Nature, Landscape, the Antique, and the Living Model Draped. Elementary and Applied Design, &c. The Class for Wood Engravers meets three times a week.—Prospectus and Forms of Admission may be obtained at the School, 43, Queen-square.

By order,
LOUISA GANN, Superintendent and Secretary.

THE CENTRAL TRAINING SCHOOL OF ART, at South Kensington, for Male and Female Students, and the METROPOLITAN SCHOOLS OF ART, at 43, Queen's-square, Bloomsbury, for Female Classes only (removed from 37, Gower-street), and at Spitalfields, Crispin-street; Finsbury, William-street, Wilmington-square; St. Thomas, Charterhouse, Goswell-street; Rotherhithe Grammar School, Deptford-road; St. Martin's-in-the-Fields, Castle-street, Long-acre; Lambeth, St. Mary's, Prince's-road; Hampstead, Dispensary-buildings; and Christ Church, St. George's-in-the-East, Cannon-street, WILL RE-OPEN on TUESDAY, the 1st of October.

By order of the Committee of Council on Education.

MILITARY EXAMINATIONS.—COMPETITORS for Sandhurst, Woolwich, or the Staff College, and Candidates for Direct Commissions or Staff Appointments, are PREPARED in all the Branches (compulsory and optional) of their Programmes, at the Practical Military College, Sunbury, S.W.—Apply for Prospectuses, &c. to Captain LENDY.

THE GOVERNESSES' INSTITUTION, 34, SOHO-SQUARE.—MRS. WAGHORN, who has resided many years abroad, respectfully invites the attention of the Nobility, Gentry, and Principals of Schools, to her REGISTER of English and Foreign GOVERNESSES, TEACHERS, COMPANIONS, TUTORS, and PROFESSORS. School Property transferred, and Pupils introduced in England, France, and Germany. No charge to Principals.

FRENCH, Italian, German.—Dr. ALTSCHUL, Author of 'First German Reading-Book,' (dedicated to Her Grace the Duchess of Sutherland,) &c., M. Philolog. Soc., Prof. Elocution.—TWO LANGUAGES TAUGHT in the same Lesson, or alternately, on the same Terms as One, at the pupils' or at his house. Each language spoken in his PRIVATE Lessons, and select CLASSES for Ladies and Gentlemen. Preparation for all ordinary pursuits of life, the Universities, Army and Civil Service Examinations.—9, OLD BOND-STREET, PICCADILLY.

EDUCATIONAL INSTITUTE, REDLANDS, near BRISTOL.—YOUTHS are here PREPARED for the UNIVERSITIES, Professional or General Pursuits.

Principal, S. GRIFFITH.

OXFORD MIDDLE-CLASS EXAMINATIONS.—The only First-Class Certificate awarded for the last two years at Birmingham, the Examining Centre for the Midland Counties, has just been gained by a Pupil of Brunswick School, Leamington. Three other Boys from this School passed their Examination.

Prospectuses on application.
J. H. HAWLEY, Principal.

TO ARTISTS.—TO LET, a LARGE STUDIO, with top North-East light.—Apply to 127, King's-road, Chelsea.

ST. THOMAS'S MEDICAL SESSION.

A GENERAL INTRODUCTORY ADDRESS will be delivered by ALBERT J. BERNAYS, Esq. M.A. Ph.D., the Dean, on TUESDAY, 1st October, 1861, at 8 o'clock P.M.

After which the DISTRIBUTION of PRIZES will take place.

Gentlemen have the option of paying 40*l.* for the first year, a similar sum for the second, and 10*l.* for each succeeding year; or 99*l.* at one payment, as perpetual.

Matriculation Prizes, &c.

Voluntary Matriculation Examinations are held early in October, and Prizes are given in each of the three following divisions:—

1st. In Mathematics, Classics, and Ancient History. The President's Prize of Twenty Guineas.
2nd. In Physics and Natural History. A College Prize of 20*l.*
3rd. In Modern Languages and Modern History. A College Prize of 20*l.*

The WM. TITE SCHOLARSHIP, founded by W. TITE, Esq. M.P. F.R.S., the proceeds of 1,000*l.* Consols, tenable for three years, is awarded every third year.

To the Three most distinguished Pupils for General Proficiency in each year, the following Prizes are awarded:—

FIRST YEAR'S STUDENTS.

1st. The Treasurer's Prize of Thirty Guineas. 2nd. A College Prize of 20*l.* 3rd. A College Prize of 10*l.*

SECOND YEAR'S STUDENTS.

1st. A College Prize of 30*l.* 2nd. A College Prize of 20*l.* 3rd. A College Prize of 10*l.*

The Dressers and the Clinical Clerks are awarded to merit, after examination.

THIRD YEAR'S STUDENTS.

1st. A College Prize of 30*l.* 2nd. A College Prize of 20*l.* 3rd. A College Prize of 10*l.*

Mr. Geo. Vaughan's Cheselden Medal. The Treasurer's Gold Medal.

Mr. Newman Smith's Prize of 5*l.* for the best Essay on "Neuralgia."

The Two House-Surgeons, the Resident Accoucheurs, and the Dressers are periodically selected, and are provided with Rooms and Commons in the Hospital, free of expense.

Two Hospital Registrars at an Annual Salary of 40*l.* each, or one at 80*l.*

The Committee of the "Nightingale Fund" has arranged with the authorities of St. Thomas's for educating Women as Hospital Nurses, who, on the satisfactory completion of one year's training, will be considered eligible to receive appointments as Nurses in the Metropolitan or Provincial Hospitals.

Prior to Midsummer in each year application should be made to Mrs. W. W. WARDROPER, at St. Thomas's Hospital, either by Women as Candidates for Training, or by Institutions for Trained Nurses.

The Patients are admitted daily at half-past 11 A.M., and the Out-Patients seen at half-past 12 daily.

To enter, or to obtain Prospectuses, the Conditions of the Tite Scholarship, and further Information, apply to Mr. WHITFIELD, Medical Secretary, resident at the Hospital.

UNIVERSITY OF GLASGOW.

SESSION 1861-62.

The UNIVERSITY will be Publicly OPENED, by Principal BARCLAY, on MONDAY, 4th November, at Twelve o'clock Noon.

The various Classes for the WINTER SESSION will meet on the Day and at the Hours specified below.

I. LITERATURE AND PHILOSOPHY.

TUESDAY, 5TH NOVEMBER.

Classes.	*Hours.*	*Professors.*
Humanity, Junior	8 and 11 a.m.	Mr. Ramsay.
—— Senior	9 am. and 1 p.m.	
—— Private	1 p.m.	
Greek, Junior, Tyrones	12 Noon	Mr. Lushington.
—— Proyectores	10 a.m.	
—— Senior	8 a.m. and 2 p.m.	
—— Private	2 p.m.	
Logic and Rhetoric	9 and 11 a.m.	Mr. Buchanan.
Moral Philosophy	8 and 11 a.m.	
Political Economy	8 p.m. (14th Nov.), Tues. and Thurs.	Dr. Fleming.
Natural Philosophy	9 and 11 a.m.	Mr. W. Thomson.
Physical Laboratory	10 a.m. to 3 p.m.	
Mathematics, Junior	12 Noon	Mr. Blackburn.
—— Senior	10 a.m.	
Natural History (Geology)	12 Noon, Tu., Wed., Thurs. and Friday	Dr. Rogers.
Astronomy	1 p.m., Wednesday	Mr. Grant.
Civil Engineering and Mechanics	3 p.m.	Dr. Rankine.

II. THEOLOGY.

TUESDAY, 5TH NOVEMBER.

Divinity, Junior	9 a.m.	Dr. Hill.
—— Senior	12 Noon	
Hebrew, Junior	10 a.m.	Mr. Weir.
—— Senior, Public	1 p.m.	
—— Private	9 a.m., Mon., Wed., and Friday	
Arabic	9 a.m., Tu. and Th.	
Ecclesiastical History	11 a.m.	Dr. Jackson.

III. LAW.

TUESDAY, 5TH NOVEMBER.

Roman Law, Scottish Law, Mercantile, Conveyancing	9 a.m.	Mr. Skene, Advocate.

IV. MEDICINE.

TUESDAY, 5TH NOVEMBER.

Chemistry	10 a.m.	Dr. Anderson.
Practical Chemistry	12 Noon	
Chemical Laboratory	½ a.m. to 4½ p.m.	
Anatomy	11 a.m.	Dr. Allen Thomson and Demonstrator.
Anat. Demonstrations	1 p.m.	
Practical Anatomy	10 a.m. to 4 p.m.	
Practice of Physic	11 a.m.	Dr. M'Farlane.
Surgery	12 Noon	Mr. Lister.
Forensic Medicine	12 Noon	Dr. Rainy.
Materia Medica	2 p.m.	Dr. J. A. Easton.
Midwifery	3 p.m.	Dr. Pagan.
Institutes of Medicine	4 p.m.	Dr. A. Buchanan.

Matriculation.—By Regulation of the Senate, every Student is required, at the beginning of the Session, to Matriculate, by enrolling his name in the University Album, at the Library, before joining any Class. The Library will be open, for the purpose of Matriculation, on and after Wednesday, the 16th of October, from 11 to 3 o'clock daily, with the intervention of the holidays at the Sacrament.

Entrance Examination.—By Ordinance of the Universities Commissioners, "Any Student who, at the time of his entrance to the University, shall satisfy the Professors in the Faculty of Arts on examination, that he is qualified to attend the higher Classes of Latin, Greek, and Mathematics, or any of them, is admitted to such higher Class or Classes, without having previously attended the First or Junior Class or Classes in the same department or departments; and, in the case of such Students, the Course of Study for the Degree of Master of Arts may be completed within Three Winter Sessions instead of Four." The Examination for this purpose will take place in the commencement of the Session.

By order of the Senate,
DUNCAN H. WEIR, A.M., Clerk.

Glasgow College, Sept. 10, 1861.

REPEAL of the TAXES on LITERATURE and the PRESS.—TESTIMONIAL to the Right Hon. T. MILNER GIBSON, M.P.

Subscriptions, limited to One Pound, received at Drummonds, Charing Cross; and by Robert Chambers, Treasurer, 47, Paternoster-row, E.C. JOHN FRANCIS,
Committee Room, Hon. Secretary.
47, Paternoster-row, E.C.

A REVIEWER in one of the first London Papers, having a most extensive knowledge of English and Foreign Literature, who can give the highest testimonials as to his capacity and specimens of his style, is open to an ENGAGEMENT.—Address B. A., 50, Lower Sloane-street, Chelsea.

THE PRESS.—A PARTNER, of literary ability and business capacity, is wanted by the Projectors of a New Journal, for establishing which all the arrangements are already matured, and which will present features of special novelty, insuring its circulation among numerous and influential classes of the community. Only a moderate capital required, to be exclusively employed, under his own supervision, in developing the enterprise which promises to prove speedily and abundantly lucrative.—Address ZETA, Onwhyn's Newspaper Office, 1, Catherine-street, Strand.

TO PUBLISHERS.—A GENTLEMAN of capital is desirous of embarking in the PUBLISHING BUSINESS, either as Partner or by Purchase.—Address, in the first instance, to X. Y. Z., care of Mr. Lindley, 19, Catherine-street, Strand, W.C.

WANTED, an ASSISTANT, in a PRINTSELLER'S Establishment, at the West End. He must be well educated, and of gentlemanly address, and not less than 25 years of age. He will be required to attend on customers, and make himself generally useful. Only such answers will be noticed that state full particulars as to how and where previously occupied, salary expected, &c. Only those thoroughly acquainted with the business will be treated with.—Apply, by letter only, to Mr. HERING, 137, Regent-street.

THE AQUARIUM.—LLOYD'S PRACTICAL INSTRUCTIONS for TANK MANAGEMENT, with Descriptive and Priced List, 162 pages and 101 Engravings, post free for twenty-one stamps.—Apply direct to W. ALFORD LLOYD, Portland-road, Regent's Park, London, W.

"Many manuals have been published upon aquaria, but we confess we have seen nothing for practical utility like this."
Era, Oct. 14, 1860.

THE FRIENDS of a LADY, suffering from the effects of Intemperance, wish to place her in a Private Family, where every care may be taken of her.—Address V., care of H. Greenwood, Advertising Agent, Liverpool.

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TO BOOKSELLERS, STATIONERS AND PRINTERS.—PARTNER WANTED.—1,300*l.* to 1,400*l.* required. Returns above 5,000*l.* Churchman preferred. First-class Business, fifty miles from Town.—Address, for particulars, Mr. HOLMES, 48, Paternoster-row.

LADIES' DRAWING CLASSES.—Mr. B. R. GREEN, Member of the New Society of Painters in Water Colours, and Author of various Publications on Drawing and Perspective, begs to announce that his CLASSES (limited to six Pupils each) will RE-ASSEMBLE October 1st.—For terms, &c. apply to Mr. GREEN, 41, Fitzroy-square; or of Messrs. ROWNEY, Rathbone-place.

GREEN'S RUSTIC DRAWING MODELS, enabling the Pupil to Sketch at once from Nature. First set (stile, roller, hencoop, dovecote, pump, cottage-door), with figure complete, 1*l.* 1*s.*; singly, from 2*s.* 6*d.*—Sold by Messrs. Rowney, Newman, Reeves, Ackermann, and the Inventor as above.

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NOTICE.—TO TOURISTS IN IRELAND.—SIR CUSACK RONEY'S MONTH IN IRELAND: HOW TO SPEND IT, AND WHAT IT WILL COST, is now ready, price 1*s.*—W. H. SMITH & SON, and all Railway Stations; M'Glashan & Gill, Dublin.

ITALY and THE EAST.—The Travelling Student in Architecture of the Royal Academy of Arts, London, at present in the South of France, offers his services to any NOBLEMAN or GENTLEMAN ABOUT TO TRAVEL, to whom his knowledge of the Fine Arts and Sketching would be of value.—Address J. R., care of Mr. Cates, 7, A, Whitehall-yard, London, S.W., who will also answer any inquiries.

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By WHEATLEY & CO.'S (late Waghorn,) Parcel Express, Passenger, and Insurance Agency.
DAILY.—To the Continent, Spain.
WEEKLY.—Portugal, Mediterranean, Egypt, Arabia, Africa, Canada, America.
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MONTHLY.—Australasia, New Zealand, Cape Colonies, Western Africa, Mexico, Brazils, Pacific.
Tariffs, with through rates to 800 places, apply at 23, Regent-street, S.W.; Chaplin's, Regent-circus, W.; 156, Cheapside, E.C.; and the Chief Office, 150, Leadenhall-street, E.C.

MR. B. H. SMART, REMOVED to 76, Charlwood-street, Belgrave-road, S.W., continues to INSTRUCT CLERICAL and other PUPILS in ELOCUTION, to attend Classes for English generally, and to engage for Readings.—'The INTRODUCTION to GRAMMAR on its TRUE BASIS, with relation to Logic and Rhetoric,' price 1*s.* of all Booksellers.

ON SALE.—The ILLUSTRATED LONDON NEWS, from commencement down to 1861, 31 vols. bound, half calf neat, except the last, in numbers. Price 15*l.*—Address E. G. H., care of T. Hodgson, Advertising Agent, Liverpool.

STAINED GLASS AND WALL PAINTING.
Notice of Removal.

MESSRS. CLAYTON & BELL,
(Late of 24*a*, Cardington-street, Euston-square,)
Have Removed to
311, REGENT-STREET, W.,
(Adjoining the Polytechnic Institution.)
Premises affording them accommodation and facilities more completely suited to the necessities of their work than were attainable at their old establishment.

Sales by Auction

Microscopic Objects, Photographic Apparatus, &c.

MR. J. C. STEVENS will SELL by AUCTION, at his Great Room, 38, King-street, Covent-garden, on FRIDAY, September 27, at half-past 12 precisely, a quantity of EXCELLENT MICROSCOPIC OBJECTS, the PROPERTY of the late COUNT ALFRED DE LIMMINGHE, two good Microscopes, Chemical Glass, Photographic Apparatus, Electrical Lamp, Magic Lantern Slides, and a variety of Miscellaneous Articles.
May be viewed the day prior and morning of Sale, and Catalogues had.

Pictures, Drawings, Engravings, Bronzes, and Objects of Art and Virtù, the Property of Messrs. THOMAS AGNEW & SONS.

MESSRS. CHRISTIE, MANSON & WOODS respectfully give notice, that they have received instructions from Messrs. THOMAS AGNEW & SONS, to SELL by AUCTION, at the ROYAL EXCHANGE ROOMS, MANCHESTER, on THURSDAY, October 17, and seven following days, at 12 o'clock each day, in consequence of the retirement from business of Mr. Thomas Agnew, the Senior Member of the firm, and owing to the contemplated extensive alteration of their premises, which necessitates the removal of the property, a large portion of their very valuable assemblage, including ENGLISH PICTURES of high class, and comprising the Ordeal of Touch, the grandest work of Maclise, R.A.—Lear recovering at the Sound of Cordelia's Voice, by C. W. Cope, R.A., from the Brunel Collection, and exhibited at the Art-Treasures Exhibition—Summer in Kent, the large picture exhibited this year at the Royal Academy, by T. S. Cooper, A.R.A.—A fine Gallery Work of the late F. Danby, R.A., and The Shipwreck, the well-known work of the same Master—The First Pair of Shoes, and Bed-Time, by W. P. Frith, R.A.—The Young Gondolier, and two others, by F. Goodall, R.A.—An Evening at Whitehall in the Reign of Charles II., by E. M. Ward, R.A.—The Derby Day, by Frith, from Mr. Fairrie's Collection—Lost in the Woods, by R. Redgrave, R.A.—The Valentine, by T. Faed, A.R.A.—The Trent Side, a beautiful work of T. Creswick, R.A., exhibited at the Royal Academy this year, and two other important Works of the same Master—Erith Church, the exhibited work of Anthony—Venice, by D. Roberts, R.A.—A Scene from 'Taming of the Shrew,' a splendid chef-d'œuvre of A. Egg, R.A., exhibited at the Royal Academy, and The Council of War, by the same Artist—The Beach at Hastings, and an Upright Landscape, by Sir A. W. Calleott, R.A.—A Rustic Subject, a beautiful work of Poole, R.A.—A Landscape, with Cattle, and another important Work of J. Linnell, sen.—A very fine Winter Scene, by W. Muller—The Improvisatore at Venice, by Muller; and Fine Examples of Stanfield, R.A., Webster, R.A., Cooke, A.R.A., Ansdell, A.R.A., Faed, A.R.A., O'Neill, A.R.A., Rankley, Kennedy, Pyne, Branthwhite, Marshall, Baxter, M'Innes, M'Callum, Noel Paton, Provis, Knight, &c. &c. The Drawings are of the highest class, and bought from the Artists and Exhibitions, many exhibited during the current year, including A Soldier's Story, a chef-d'œuvre of Jenkins—Christmas Time, an important work of F. Tayler, and five others by this favourite Artist—Santa Catalina, a beautiful example of D. Roberts, R.A.—Cordova, The Study at Abbotsford, and Melrose, by the same great Master—Malmsbury Abbey, Lichfield, Aberystwith, and others, by Turner, R.A.—Four Gems by Birket Foster—Several fine Works of Prout, and others by Gilbert, Pyne, Richardson, Hunt, Cox, Harley, De Wint, Girtin, Rowbotham, Smallfield, Goodall, Fripp, Topham, C. Haag, Barrett, C. Fielding, Stanfield, Duncan, Nash, S. Cooper, Hemsley, Dodgson, and Davidson.
The Children in the Wood, the very celebrated group in marble, by John Bell, executed and exhibited in Hyde Park in 1851, where it was purchased by its late owner—Fine Bronzes, Marbles, Clocks, and Candelabra, Glasses, Decorative Furniture, Porcelain and Glass, and a great variety of Objects of Art and Virtù; Ancient and Modern Engravings, and Books of Engravings.
May be viewed two days preceding, and Catalogues had at Messrs. Christie, Manson & Wood's Offices, 8, King-street, St. James's-square, S.W.; of Mr. Holmes, Cherry-street, Birmingham; Mr. Roberts, Eastgate-row, Chester; Messrs. Briggs & Mensforth, Printsellers, Bradford; Messrs. Pawsons & Brailsford, Sheffield; Mrs. Carr, Fishergate, Preston; M'Clure & Sons, Buchanan-street, Glasgow: and at Messrs. Agnew & Sons' Establishments in Exchange-street, Manchester; London and Liverpool Chambers, Liverpool; and 5, Waterloo-place, London, S.W.

LONDON, SATURDAY, SEPTEMBER 21, 1861.

LITERATURE

Letters and Papers illustrative of the Reigns of Richard III. and Henry VII. Edited by James Gairdner. Vol. I. (Longman & Co.)

THE chronicles and memorials of England and Scotland during the Middle Ages are succeeding each other with an agreeable rapidity. The volume before us is only a portion of a work yet to be completed, and it refers to a period in which the interest is permanent. The opening is solemn and dramatic—namely, the funeral of Edward the Fourth, with its preparatory incidents,—the "body washed and cleansed by a bishop"; after which, and other attentions due to defunct royalty, "the corpse was laid upon a board, all naked, saving he was covered from the navel to the knees, and so lay ten or twelve hours, that all the lords, spiritual and temporal, then being in London, or near thereabout, and the Mayor of London, with his brethren, saw him so lying." Subsequently, the body lay in greater state, the preceding directions for which are very minute as to splendour of costume and position, with "his one hand upon his body, and a sceptre in the other hand, and on his face a kerchief, and so showed to his nobles, by the space of two days and more, if the weather will suffer. And when he may not goodly longer endure, take him away and bowel him,"—and so farewell King Edward!

To the next scene we turn with an impatient curiosity, hoping to be made witnesses of something hitherto unknown touching the hapless young princes and their uncle Gloucester. Here, however, we are disappointed. The documents, collected from various and widely-separated sources illustrative of the reign of Richard the Third, are very meagre, and not of general or particular interest. They comprise directions to the authorities at Calais, who are informed that they are not bound by any oath of allegiance to Edward the Fifth, the Lords having found Richard the true heir to the crown. Then follows a proclamation previous to the coronation, in which peace is enjoined, the carrying of arms forbidden, and all men ordered to be in bed by ten o'clock at night. The other Papers have reference to foreign alliances,—to questions of peace or war with Scotland,—and to negotiations with the nobles of Ireland, where the King's father, Richard Duke of York, had once been governor, and had left a memory honoured and loved because of the liberality and political wisdom of his administration. The only passage in any of these Papers in which we approach, as it were, to the threshold of Richard's home, is a short note to Louis the Eleventh, in which the writer thus expresses himself:—"My Lord, my cousin, I commend me to you as much as I can. I have written to my servant, Blanc Sanglier, now being with you, to make provision of certain wines of the growth of Burgundy and La Haulte France, for myself and the Queen my consort." It is pleasant, considering how things went in that royal household, to think of Richard and Anne quietly sipping their Burgundy while talking over the bygone days of their old loves and more recent adventures. Richard has set his heart on this Burgundy. He asks Louis to allow this little commission to be executed without "any disturbance or contradiction." He adds, "you will do me in this a very singular pleasure; and if there can be anything I can do for you, on your informing me, I will accomplish it very willingly." Let us hope that the wine arrived safely, and that Richard, if he really poisoned "the Queen our consort," did not make use of this identical Burgundy, which he so particularly coveted.

One other circumstance illustrative of the social life of Richard and his tastes is to be found in his anxiety, after conciliating the great Irish lords, to induce them to lay aside the old "Irish array," and assume the English costume. For this purpose, he actually sends no less a man-milliner than a bishop, with patterns of various parts of dress, and models of caps, and vests, and hose, and such like matters that go to make up the man. Probably, the prelate may have had some other samples in his band-box, and other work besides displaying his samples; but that such things should have gone together is something curious, and since the days of that handsome prelate of Canterbury, who came to us from Savoy, there had never been a bishop or archbishop who had troubled himself on others on the subject of such gauds as these.

After the brief space occupied by the Papers above mentioned, the bulk of the volume is devoted to documents illustrative of the reign of Henry the Seventh, from 1486 to 1508. The anxiety of this king to enjoy the continual favour and encouraging countenance of the Pope is manifested by his tone of reverence, and the gusto with which he informs His Holiness of the appalling fate of men who despised Papal interdicts, sudden death and immediate corruption of body having happened, within his own knowledge, to one who laughed at the Pope, and was adverse to the Tudor king—a combination of incidents very artistically put together.

Perhaps, the condition of the kingdom, and the political atmosphere of the period, the year 1500, cannot be better described than by a letter from De Puebla, the Spanish ambassador here, to his sovereigns, Ferdinand and Isabella. After kissing the royal feet and the hands of their Highnesses, De Puebla states that "by the good fortune of your Highnesses and the lady Princess of Wales, this kingdom is at present so situated as has not been seen for the last five hundred years, till now, as those say who know best, and as appears by the Chronicles; because there were always brambles and thorns of such a kind that the English had occasion not to remain peacefully in obedience to their king, there being divers heirs of the kingdom, and of such a quality that the matter could be disputed between the two sides." When it is remembered that the judicial murder of the young Earl of Warwick, the "last of the Plantagenets," is said to have been insisted on by Spain, as one of the necessary preliminaries to the marriage of Katherine of Arragon with the Prince of Wales, the following passage in this despatch has double significance:—"Now it has pleased God that all should be thoroughly and duly purged and cleansed, so that not a doubtful drop of royal blood remains in this kingdom, except the true blood of the King and Queen, and, above all, that of the lord Prince Arthur. And since of this fact," adds the ambassador, "and of the execution which was done on Perkin and on the son of the Duke of Clarence, I have written to your Highnesses in various ways, I do not wish to trouble you with lengthy writing." The execution done on the son of the Duke of Clarence was as cruel a murder on the part of Henry the Seventh as that done by Richard on his nephews, with this addition, that it neither saved the kingdom from anarchy, nor served the King, except in obtaining a wife for his son, and securing their possible offspring from the pretensions of a rival.

Henry himself, however, was not yet altogether secure; there remained one pretender to the throne in the person of Edmund De la Pole, Earl of Suffolk, son of the loyal old duke who had married the sister of Edward the Fourth, and brother of the traitor Lincoln, who fell, at Stoke, fighting against Henry. Mr. Gairdner states correctly that "the story of the Earl of Suffolk has been very imperfectly told, and cannot be fully read without the aid of Papers which are here, for the first time, published." The importance of the Poles arose from the marriage of the eldest son of the family, John, Earl of Lincoln, with Elizabeth, sister of Edward the Fourth and Richard the Third. The latter King, when childless, appointed John his heir, but Bosworth Field settled that appointment, and John fell fighting against Henry the Seventh, at Stoke. His next brother, Edmund, on the death of his broken-hearted sire, the Duke of Suffolk, was allowed, for a "consideration," to take the title of *Earl* of Suffolk; but his allegiance always sat uneasily upon him, and as he was constantly at feud with the King, he began to look upon the latter as sitting in the usurped seat of the defunct John, Earl of Lincoln, to whom Edmund De la Pole was next heir. The latter does not seem to have been quickened in grateful feeling towards a king who had once saved him from cord or axe, by pardoning him after conviction on a charge of murder; and when Edmund suddenly left England he had good reason for expecting to find a friend and supporter in the person of Maximilian, Emperor of Germany. That sovereign, however, promised unreservedly, but broke his pledges, and finally turned Edmund adrift for the paltry bribe of ten thousand pounds,—which sum it is quite as wonderful a circumstance that Henry should be willing to actually pay down. The Pretender now led a wandering and painful life. Denmark, France, Scotland, Flanders,—everywhere was the hostility against him active or the friendship delusive. How entirely he was ruined in a pecuniary sense, how great was his misery, how fatal he had become to his kinsmen and adherents at home and abroad,—these Papers fully demonstrate. In every place of hoped-for refuge, he was a prisoner rather than a guest; and he was pitilessly hunted down till he fell within reach of the arm of Philip of Castile, who ultimately sold the wretched yet haughty wanderer and rebel to the King of England, who, quietly biding his time, and cruelly feeding his prisoner with hope, according to report "before he left the world, recommended his son to do that," which he had promised not to do himself. However this may be, the truth is, that in the year 1513 when England was at war with France, and Richard, the brother of Edmund, took service under the French king against his country, Edmund was sent to the block, apparently without having committed any new offence of his own. The dukedom of Suffolk was made over the following year to Charles Brandon, whose only son (the Earl of Lincoln), by Mary, the sister of Henry the Eighth, dying in his father's lifetime, the dukedom fell successively to his two sons by his last and fourth wife, and the title in that line became extinct, for want of male heirs.

Mr. Gairdner traces the fortunes of Edmund's brother Richard. "He was looked upon as one of the most distinguished of the French captains, and fell with the flower of their army at the battle of Pavia, when Francis the First was taken prisoner, in 1525." This, however, leaves the history of the house imperfect. Edmund had two other brothers, of whom no mention is made either in the documents or

the Prefaces to them, in this volume. They were perhaps, too obscure for history, but Cambridge has not altogether forgotten them. After ruin had fallen upon their family, these two brothers, Humphry and Edward, took to their books, in the above University, preferring, as it has been said of them, to claim by their own right title to learning than to be called lords by the courtesy of others. The highest dignity attained by these scions of a house whose first man of mark was Michael De la Pole, the Lord Chancellor, himself the son of a Yorkshire merchant who lent money to Edward the Third, was that of Archdeacon of Richmond, in the person of Edward.

With Mr. Gairdner's Second Volume, we shall pursue the course of history on which many of the documents he has already published reflect a new and interesting light.

On Food: being Lectures delivered at the South Kensington Museum. By E. Lankester, M.D. (Hardwicke.)

The Cook's Guide and Housekeeper's and Butler's Assistant. By Charles Elmé Francatelli. (Bentley.)

CHEMISTS tell us that diamonds are based on charcoal,—but nobody ever yet thoroughly succeeded in making a diamond out of charcoal—a bright, pure, light-giving brilliant like Coggi Hassan's, that diamond of all diamonds! There is a genius in Nature beyond all the receipts of Art, and unless men have a touch of that genius no instructions will avail them. The distance between the crude elements of food presented to us by Dr. Lankester in his Lectures, beginning with Salts and Phosphates, Heat-forming Foods, Flesh-forming Foods, the Oxygen and the Hydrogen and the Carbon, Ethyls, Tartrates, Citrates, Sulphates, and things too occult and numerous to be catalogued here,—the distance, we say, betwixt all these and the brilliant results produced by M. Francatelli from these elements, and chronicled for the benefit of the unlearned and the unskilled in his 'Cook's Guide and Housekeeper's Assistant,' is nearly as great and the difficulties almost as insuperable as betwixt the base charcoal and Coggi Hassan's diamond! Receipts are nothing without the genius to put them into practice. Genius itself is an occult combination of virtues, as mysterious as the process of making diamonds; many men and many women possess the virtues in their crude estate, but in how very few do they exist as genius! Food is a great subject, of universal interest:—"*L'homme en mangeant remonte ses ressorts.*" Dr. Lankester resolves our food into its elements; M. Francatelli combines them into forms endowed with tastes, odours and virtues that are proudly perfect and defy the curious analyzer to do aught but—eat them.

M. Francatelli writes down in good and lucid English his method of dressing Christmas Pies—Chickens à la Milanaise—Rice à la Sœur Nightingale—Mutton in fifteen different fashions,—to say nothing of Poultry and Game in forms which bewilder the imagination;—with hints and receipts for side-dishes "for every-day fare," which, if realized, would make a plain man believe himself a perpetual Lord Mayor. He tells us "How to dress Vegetables," in which every receipt is an excuse for the Vegetarians;—shows us methods of dressing Eggs which our grandmothers did *not* know;—"different kinds of Puddings," "Small Pastry," "Creams," very far removed from the simplicity of the original cow;—Salads and Potted Meats, and Cold Entrées to use up scraps;—in short, a glimpse, a beatific vision of the wonderful resources and possibilities that exist in bread, meat and vegetables. After reading 'The Cook's Guide' a housewife might be driven to despair and a husband "to register a vow" never to forgive cold mutton or tough steak. A man might believe that a bad dinner, if there were *anything* in the larder to make it of, was a sin; but let him be merciful, and reflect that, along with his receipts and rules, M. Francatelli has not been able to give the gift of following them. Aspiration is the first step in the ladder of perfection; and if M. Francatelli can cause his readers to desire to follow his precepts he will have achieved much. In practical matters success will generally crown painstaking. It is not alone in what he teaches that he is great,—his warnings will strike dismay into the heart of timid young housekeepers just beginning their domestic career. The Preface crushes the favourite handbooks of domestic instruction without mercy and without remorse. Surely the Authors of 'The Modern Housewife' and of 'Modern Domestic Cookery' were not actuated by a malignant demon when they enjoined their followers to "make their green pea soup with milk," to flavour their "gravy soup with walnut catsup," and to "cook rabbits with the indiscriminate use of wine, lemon, vinegar, butter, garlic, spices and cayenne pepper." But such, alas, is the fact, and as M. Francatelli sadly says, "it is beyond a doubt that too many who have presumed to write on the art and science of Cookery are very far from possessing any adequate knowledge of the art and science they so recklessly attempt to teach";—no wonder, therefore, that the diamond has not yet been obtained out of the charcoal!

But there is a genius required in the eater as well as in the cook,—"Les animaux se repaissent, l'homme mange—l'homme d'esprit seul sait manger," says the highest authority upon gastronomy. "La destinée des nations dépend de la manière dont elles se nourrissent;"—after that no more need be said to prove that the homely proverb about "the devil sending cooks" is the highest act of malignity ever attributed to him,—the power of malice can no further go!

The Lectures of Dr. Lankester, originally delivered at the South Kensington Museum, possess the great merit of being interesting. The information, although it may be gathered from sources not inaccessible to those who will read for themselves, is brought together and arranged with the intelligence of a man who thoroughly understands and performs what he intends to do. The facts thus presented gain an additional value by bearing the impress and sanction of his own opinions. The Lectures give an account of the principal objects of our food and drink,—their constituent parts, their chemical combinations, their effect upon the human system, their relative value as nutritive, or restorative, or stimulant. In addition to the chapters on Food and Drink, there is an additional chapter on Tobacco and the Use of Opium, another on Spices and Condiments; these are the most interesting in the book. There is no pretence about these Lectures; the style is clear and pleasant: and for a work of general information on a subject interesting to everybody these Lectures on Food will be useful and popular. They contain the information which every one ought to possess, and there is skill shown in giving as much as is necessary and no more than is desirable. Dr. Lankester has fulfilled the task he proposed to himself with judgment and success.

After Icebergs with a Painter: a Summer Voyage to Labrador and around Newfoundland. By Rev. Louis L. Noble. (Low & Co.)

THOSE who, like ourselves and probably some of our readers, are fresh from the glaciers around Mont Blanc and Monte Rosa, will gladly take in hand a volume on Icebergs. The Swiss glaciers are grand and beautiful; but to mere passing and popular apprehension they are motionless and monotonous. Accurate measurements assure us that they move at certain ascertainable rates; and the occasional discovery, as recently near Chamouni, of the relics of long since perished guides and mountaineers confirms such scientific assurance. Otherwise, we might regard them as being movelessas the great mountains whose sides they adorn. But the iceberg is the living, voyaging glacier—the wandering Alp of the sea. The Alpine glacier moves inch by inch, the iceberg mile by mile. The iceberg advances further in one day than the glacier in one year. The glacier stretches itself upon its own rocky rack, and its icy limbs crack and rend, and are dismembered by the voluntary process. The iceberg floats on, for a time, whole and unbroken. It floats upon a yielding bed of water; it sways gently down the waves; it bends gracefully under its own gravity; and for a brief while preserves its gelid integrity, amidst storms and tempests, and the continual sappings of its foundations.

In these respects, it is the opposite of the glacier of the mountains, even though in the mountains it may have been cradled. So soon as the impelling action from behind becomes more and more energetic in the high steeps of its birthplace, by a process comparatively noiseless and gradual (not by sudden and sharp disseverance, as many suppose), and by annual proportions, step after step, these enormous ice-masses gradually reach the waters which are swelling in readiness to receive them. While the lesser masses fall and break off into the brine, the larger ones gradually glide into the buoyant element, and there begin their devious career. They have escaped from the rigid embrace of the nurturing mountain. They are now launched into life and motion. They have left the calm, quiet deathliness of the parent source for ever, and they are off upon a voyage of discovery. Of dazzling brilliancy at their sharp edges, shooting up into spear-like pinnacles, or stretching along in sharp shelf-like longitude, the bright sunlight beams through them in flaming glory, or softened blue, and here and there in subdued pearly lustre. Freshly broken statuary marble or fractured porcelain may afford a humble idea of the closely crystallized mass where it has been newly broken asunder; but you must gaze on Alpine snow-peaks at sunrise or sunset, and watch the glowing, gorgeous, and finally faintly-dying hues, all passing for a few entrancing minutes over the spotless snow-ground in indescribable glory, before you can fully understand descriptions of a similar glow and glory on the floating facets of the northern bergs. Yet the whole vocabulary of metaphoric terms will scarcely help us; for when it is said that you now gaze upon walls of polished silver, with veins of sapphire blue, and oblique bars of opaque white; now on sculptured crags, streaming with rivulets of falling brine; here on deep flutings and wrinkled folds, through which the green and silvery waters rush back to the sea; there on endless graces of outline, and at sunset on endless shiftings and graduations of colour, from tints of flame to paleness of lilies, from bloom of rose and carnation to violet blue, from washes and draperies of orange,

scarlet, crimson, purple, down to harder but shining metallic tints of gold, bronze and copper; while, in addition to all these hues, upon the body of the berg itself you behold the glowing mirror of the outstretched sea, and discern the long breakings of the rolling waves upon the glistening mass, and the lengthening out of the shattered waters round the rough edge of the floating mountain;—when you have laid on your words with the choicest selection and the utmost skill, you have but to begin again with the same words at the next iceberg. But the words are now stubborn and stale, and you cannot newly match them to the ever-shifting shades and glories of illuminated ice. You have built up one fine verbal structure, and just when you have placed the last pictorial word in due place—down, like the iceberg you have depicted—down topples the whole unsubstantial fabric into the engulphing waste of waters.

Mr. Noble has evidently found this out early in his book; but he had nothing else before him worth writing about than icebergs, and therefore he works away with his words most manfully, often cleverly, and often also wildly and without licence. Amidst all the dash and freedom, however, there are too many and manifest marks of labour and straining after effect, which not unfrequently degenerate into hyperbole or tawdriness, as when, in his 'Story of an Iceberg,' Mr. Noble exclaims, "Let us take one more look at the berg—a farewell look. It is a beautiful creature—superlatively beautiful. It is more—sublime and beautiful fold upon fold—spotless ermine—caught up from the billows, and suspended by the fingers of Omnipotence.—The Merciful One! It is falling! Cliffs and pinnacles bursting—crashing, tumbling with redoubling thunder.—Pillars and sheaves of foam leap aloft," &c. After this, it is quite time the berg should fall,—or the author will! Writers of this author's school have singular notions of metaphorical propriety, and therefore we are not much surprised at reading of a piece of ice which resembles an antler of a moose or elk. "Now that we have it in the boat, it resembles a pair of mammoth moose-horns sculptured from water-soaked alabaster." We suppose also that Mr. Noble considers the following as one of his most poetic figures:—"Power and Beauty, hand in hand, bathing the bosom of Purity. I need not pause to explain how all this is." Nor need we, even if we could, explain.

We prefer to give some better specimens of the author's descriptive powers, and begin with the first iceberg he sees:—

"Icebergs! Icebergs!—The cry brought us upon deck at sunrise. There they were, two of them, a large one and a smaller: the latter pitched upon the dark and misty desert of the sea like an Arab's tent; and the larger like a domed mosque in marble of a greenish white. The vaporous atmosphere veiled its sharp outlines, and gave it a softened, dreamy, and mysterious character. Distant and dim, it was yet very grand and impressive. Enthroned on the deep in lonely majesty, the dread of mariners, and the wonder of the traveller, it was one of those imperial creations of nature that awaken powerful emotions and illumine the imagination. Wonderful structure! Fashioned by those fingers that wrought the glittering fabrics of the upper deep, and launched upon those adamantine ways into Arctic seas, how beautiful, how strong and terrible! A glacier slipped into the ocean, and henceforth a wandering cape, a restless headland, a revolving island, to compromise the security of the world's broad highway. No chart, no sounding, no knowledge of latitude, avails to fix thy whereabout, thou roving Ishmael of the sea. No look-out, and no friendly hail or authoritative warning can cope with thy secresy or thy silence. Mist and darkness are thy work-day raiment. Though the watchman lay his ear to the water, he may not hear thy coming footsteps. We gazed at the great ark of nature's building with steady, silent eyes. Motionless and solemn as a tomb, it seemed to look back over the waves as we sped forward into its grand presence."

Mr. Noble meets with an English clergyman, stationed in Newfoundland, "who has true feeling and a thorough appreciation of fine scenery, and whose descriptive abilities are rare." As a specimen of them he adds the following description of an iceberg:—

"He says that an iceberg is to him the most impressive of all objects. Most beautiful in its life and changes, it is, next to an earthquake, most terrible and appalling, in the moment of its destruction, to those who may happen to be near it. Upon the falling of its peaks and precipices, waves and thunders carry the intelligence across the waters. Lofty as it frequently is, the head only, helmeted and plumed with dazzling beauty, is above the sea. In its solemn march along the blue main, how it steps upon the high places of the deep, is all unseen. Around its mighty form, far down its alabaster cliffs and caverns, no eye plays but that of the imagination. When it pauses in its last repose, and perishes, at times, as quickly as if it were smitten by the lightning, you may stand in the distance and gaze with awe, but never draw near to witness the motions and sounds of its dissolution. After tea, we sat by the windows, which face the east and command the harbour, with its grand entrance from the Atlantic, and enjoyed the scene, one of unusual splendour, every cliff glowing with hues of reddish orange."

The voyager does at last see a falling berg, not that one at whose fall he invokes "the Merciful One." It was like Windsor Castle when he first beheld it about five miles away, and began to write a description of it. It was "a mighty and imposing structure," but

"between making my last dot and now—an interval of ten minutes—Windsor Castle has experienced the convulsions of an earthquake, and gone to ruin. To use the term common here, it has 'foundered.' A magazine of powder fired in its centre could not more effectually, and not much more quickly, have blown it up. While in the act of sketching, C—— suddenly exclaimed: when, lo! walls and towers were falling asunder, and tumbling at various angles with apparent silence into the ocean, attended with the most prodigious dashing and commotion of water. Enormous sheaves of foam sprang aloft and burst in air; high, green waves, crested with white caps, rolled away in circles, mingling with leaping shafts and fragments of ice re-appearing from the deep in all directions. Nearly the whole of this brilliant spectacle was the performance of a minute, and to us as noiseless as the motions of a cloud, for a length of time I had not expected. When the uproar reached us, it was thunder doubled and redoubled, rolling upon the ear like the quick successive strokes of a drum, or volleys of the largest ordnance. It was awfully grand, and altogether the most startling exhibition I ever witnessed. At this moment, there is a large field of ruins, some of them huge masses like towers prone along the waters, with a lofty steeple left alone standing in the midst, and rocking slowly to and fro."

Another iceberg is christened the Great Castle Berg, and announced as "the grand capital of the city of icebergs now in the waters of Belle Isle, and, if I except the Windsor Castle Berg which we saw founder, the largest we have seen, and, what is most likely, the largest we shall ever see." As to its supposed dimensions,—"If this were floated up into that grand bend of Niagara, I think it would fill a large part of it very handsomely, with a tower rising sufficiently above the brink of the fall to be seen from the edge of the river for some distance above. Imagine the main sheet, reaching from Table Rock toward the Horse-shoe, to be silent ice, and you will have no very wrong notion of the ice before us at this moment."

A study of the vast mass results in an elaborate picture:—

"We have rounded an angle to the southern front, and look upon a precipice of newly-broken alabaster crowned with a lofty peak and pinnacles. A slight sketch seems to satisfy the painter, and so we pass round to the eastern or ocean side, at which Capt. Knight, an experienced iceberger, expresses both delight and surprise. It is a cluster of Alpine mountains in miniature: peaks, precipices, slopes and gorges, a wondrous multitude of shining things, the general effect of which is imposing and sublime. We have been looking out from Battle Island upon this for days, and never dreamed of all this world of forms so grand and beautiful. Besides the main, there are two smaller bergs, but all nothing more than the crowning towers and spires of the great mass under the sea. Here is quite a little bay with two entrances, in which the pale emerald waves dash and thunder, washing the pearly shores, and wearing out glassy caverns. The marvellous beauty of these ices prompts one to speak in language that sounds extravagant. Had our forefathers lived along these seas, and among these wonders, we should have had a language better fitted to describe them. I can easily suppose that there must be a strong descriptive element in the Icelandic, and even in the Greenlandic tongues. I am quite tired of the words: emerald, pea-green, pearl, sea-shells, crystal, porcelain and sapphire, ivory, marble and alabaster, snowy and rosy, Alps, cathedrals, towers, pinnacles, domes and spires. I could fling them all, at this moment, upon a large descriptive fire, and the blaze would not be sufficiently brilliant to light the mere reader to the scene. I will give it up, at least for the present, and remark merely that we have received what the French newspapers occasionally receive—a warning. It came in the shape of a smart cracking of rifles in some large reverberating hall. There is undoubtedly at hand the finest opportunity one could wish of witnessing an ice-fall."

We do not, however, discover whether the author witnessed this expected fall. Perhaps a fog curtained in the catastrophe. He presents us, however, with the subjoined glance at a partial fall of another berg:—

"Any doubt that I may have entertained about the danger of lying under the shadow of this great ice-rock is now wholly dispelled. We have just witnessed what was, for the moment, a perfect cataract of ice, with all its motion, and many times its noise. Quick as lightning and loud as thunder, when bolt and thunder come at the same instant, there was one terrific crack, a sharp and silvery ringing blow upon the atmosphere, which I shall never forget, nor ever be able to describe. It shook me through, and struck the very heart. The only response on my part, and I was not alone in the fright, was a convulsive spring to the feet, and a shout to the oarsmen, of fierce command, 'Row back! row back!' The spectacle was nearly as startling as the explosion. At once, the upper face of the berg burst out upon the air, as if it had been blasted, and swept down across the great cliff, a huge cataract of green and snowy fragments, with a wild, crashing roar, followed by the heavy, sullen thunder of the plunge into the ocean, and the rolling away of the high-crested seas, and the rocking of the mighty mass back and forth, in the effort to regain its equilibrium. I dreaded the encounter; but our whale-boat was quite at home, and breasted the lofty swells most gracefully. But how fearfully impressive is all this!"

And now for an explanation of the causes of berg falls:—

"From the figure and motion of the berg, I come to describe the motive power, rather the explosive power, through which the delicate balance is destroyed, and motion made a necessity in order to gain again equilibrium and rest. Whatever may be the latent heat of ice, is a question for the professed naturalist. Two things are evident to the unlearned observer: an iceberg is as solid as ivory, or marble from the lowest depths of a quarry, and cold apparently as any substance on the earth can be made. This compact and perfectly

frozen body, immersed in the warm seas of summer, and warmer atmosphere, finds its entire outside, and especially that portion of it which is exposed to the July sun, expanding under the influence of the penetrating heat. The scrutiny of science would, no doubt, find it certain that this heat, in some measure, darts in from all sides in converging rays to the very heart. The expanding power of heat becomes at length an explosive force, and throws off, with all the violence and suddenness of gunpowder, in successive flakes, portions of the surface. The berg, then, bursts from expansion, as when porcelain cracks with sharp report, suddenly and unequally heated on the winter stove. Judge of the report when the porcelain of a great cliff cracks and falls, or when the entire berg is blasted asunder by the subtle, internal fire of the summer sun! If you would hear thunders, or whole broadsides and batteries of the heaviest ordnance, come to the iceberg then."

It will be seen from these extracts that Mr. Noble possesses considerable graphic ability; but he so often runs riot with his pen and is so continually upon the stretch with his words that his pages soon fatigue the reader. By way of relief, and as a specimen of the author's best craft in another direction, take a description of a night at sea, particularly as several recently returned voyagers may have experienced something of a like kind:—

"Through some marine manœuvre, thought necessary by the master spirit on deck, and which could be explained by a single nautical word, if I only knew what the word is, we began to roll and plunge in a manner sufficiently violent and frightful to startle from its staid quiet almost every movable in the cabin. Out shot trunks and boxes —off slid cups and plates with a smash—back and forth, in one rough scramble with the luggage, trundled the table, followed by the nimble chairs. At this rate of going on, our valuables would soon mix in one common wreck. Determining to interfere, I sprang into the unruly confusion, and succeeded in lighting a candle just in time to join in the rough-and-tumble, at the risk of ribs and limbs, and the object of mingled merriment and alarm to the more prudent spectators. Botswood, an experienced voyager, shouted me back to my berth instantly, if I would not have my bones broken at the next heavy lurch of the vessel. I was beginning to feel the force of the counsel, when another roll, almost down upon the beam-ends, overturned the butter-tub and a box of loaf-sugar, and brought their contents loose upon the field of action. They divided themselves between the legs of the table and the individual, and so, candle in hand and adorned in modest white, he sat flat down upon the floor among them, at once their companion in trouble and their protector. The marble-white sugar and the yellow butter, our luxuries and indispensable necessaries, there they were, on the common floor, and disposed for once to join in a low frolic with plebeian boots and shoes and scullion trumpery. With an earnest resolve to prevent all improprieties of the kind, one hand grasped, knuckle deep, the golden mellow mass, of the size of a good Yankee pumpkin, and held on, while the other was busy in restoring, by the rapid handful, the sugar to the safety of its box. The candle, in the mean time, encouraged by the peals of laughter in the galleries, slid back and forth in the most trifling manner possible. When we tipped one way, then I sat on a steep hill-side, looking down toward the painter, roaring in his happy valley: away slid the candle in her tin slippers, and away the barefooted butter wanted to roll after, encouraged to indulge in the foolish caper by a saucy trunk jumping down from behind. When we tipped the other way, then I sat on the same hill-side, legs up, looking up, an unsatisfactory position: back slid the candle, followed by a charge of sharp-pointed baggage, and off started the butter with the best intentions toward the tub, waiting prostrate and with open arms. Notwithstanding the repetition and sameness of this performance, the beholders applauded with the same heartiness, as if each change back and forth was a novel and original exhibition. What heightened the effect of the scene, and gave it a suspicion of the tragic, was a keg of gunpowder, which evinced, by several demonstrations of discontent in the dark corner where it tumbled about, a disposition to come out and join the candle. By a happy lull, not unusual in the very midst of these cabin confusions during a brush at sea, the powder did not enter, and I was enabled to pitch the butter into the tub, and finally myself, after some few preliminaries with a towel, into my berth, where, in the course of the small remnant of the night, I fell into some broken slumbers."

It should perhaps be added, that although the Rev. Mr. Noble is so deeply smitten with the cold beauties of icebergs, he appears to be capable of appreciating charms not appertaining to ice, but even to fair humanity. One decided proof of this appears in his own confession:— "Among the ladies there is one of more than ordinary beauty. Luxuriant, dark hair, a fair complexion with the bloom of health, a head and neck that would attract a sculptor, and surpassingly fine black eyes. There is a power in beauty. Why has not God given it to us all? You shall answer me that in heaven." Now we shall not venture to anticipate an answer so indefinitely deferred and so agreeably localized. Who the "you" is does not appear; but if he be not, like the Rev. Mr. Noble, an Episcopalian clergyman, he may not feel so sure as the author of having the opportunity to reply at the appointed place. The double assumption involved is obvious enough, and perhaps pardonable enough, especially if it included the fair lady who was already "all spirit."

Mr. Noble is pleased to throw in a little patriotic pastime about Jonathan and John Bull, in which it is remarked — "In fact, Jonathan is a youth only, and John an old man. When the lad gets his growth he will be everywhere, and the old fogy by that time comparatively nowhere." This is certainly as cool as an iceberg, especially in the present aspect of affairs. But what if Jonathan splits asunder like a shattered iceberg!—what if the Northern and Southern sides rend asunder with a fearful crash, while the "old fogy" continues unmoved as a mountain!

Another word to Mr. Noble respecting "old fogy" and his topography. This reverend writer should never touch upon English topography without referring to a gazetteer. He has but one sentence about it, and that conveys to us an interesting piece of county topography in the following words:—"A few years ago, Mr. Hutchinson, moved by a religious spirit, was induced to give up a pleasant living *in Dorsetshire under the Malvern Hills*, and devote himself to the toils and privations of a missionary in Labrador." Some men *will* be too precise: why put in "under the Malvern Hills"?

The lithographs, though not of the highest order of Art, are yet effective representations of what we may presume icebergs to be. They serve both to illustrate and to moderate the writer's verbiage. For their originals the lithographer is probably indebted to the "painter of distinction" whom the author accompanied, and who is only made known to us as a certain C——. When he went to sea, he was quite as miserable and helpless as the author. C. met and began conversing with Agassiz, who, though so familiar with Alpine glaciers, had never seen an iceberg. "But not even the presence and the fine talk of the great naturalist could lay the spirit of sea-sickness. Like a very adder lurking under the door-stone of appetite, it refused to hear the voice of the charmer. Out it glided, repulsive reptile! and away we stole, creeping down into our state-room, there to burrow in damp sheets, taciturn and melancholy, 'wretches with thoughts concentred all in self.'"

Diamonds. By William Pole. (Printed for Private Circulation.)

Mr. Pole has reprinted, for private circulation, a few notes on diamonds. Mr. Tennant has added to these notes a postscript on the imperial state crown of Queen Victoria. The two papers make an interesting summary on a popular topic, from which our readers will not be sorry to have a column of gossip by way of extract. Prof. Tennant describes the imperial crown:—

"The Imperial State Crown of Her Majesty Queen Victoria was made by Messrs. Rundell & Bridge in the year 1838, with jewels taken from old Crowns, and others furnished by command of Her Majesty. It consists of diamonds, pearls, rubies, sapphires and emeralds, set in silver and gold; it has a crimson velvet cap, with ermine border, and is lined with white silk. Its gross weight is 39oz. 5dwts. Troy. The lower part of the band, above the ermine border, consists of a row of one hundred and twenty-nine pearls, and the upper part of the band a row of one hundred and twelve pearls, between which, in front of the Crown, is a large sapphire (partly drilled), purchased for the Crown by His Majesty King George the Fourth. At the back is a sapphire of smaller size, and six other sapphires (three on each side), between which are eight emeralds. Above and below the seven sapphires are fourteen diamonds, and around the eight emeralds one hundred and twenty-eight diamonds. Between the emeralds and sapphires are sixteen trefoil ornaments, containing one hundred and sixty diamonds. Above the band are eight sapphires surmounted by eight diamonds, between which are eight festoons consisting of one hundred and forty-eight diamonds. In the front of the Crown, and in the centre of a diamond Maltese cross, is the famous ruby said to have been given to Edward Prince of Wales, son of Edward the Third, called the Black Prince, by Don Pedro, King of Castile, after the battle of Najera, near Vittoria, A.D. 1367. This ruby was worn in the helmet of Henry the Fifth at the battle of Agincourt, A.D. 1415. It is pierced quite through after the Eastern custom, the upper part of the piercing being filled up by a small ruby. Around this ruby, to form the cross, are seventy-five brilliant diamonds. Three other Maltese crosses, forming the two sides and back of the Crown, have emerald centres, and contain respectively one hundred and thirty-two, one hundred and twenty-four, and one hundred and thirty brilliant diamonds. Between the four Maltese crosses are four ornaments in the form of the French fleur-de-lis, with four rubies in the centres, and surrounded by rose diamonds, containing respectively eighty-five, eighty-six, eighty-six and eighty-seven rose diamonds. From the Maltese crosses issue four imperial arches composed of oak leaves and acorns; the leaves containing seven hundred and twenty-eight rose, table, and brilliant diamonds; thirty-two pearls forming the acorns, set in cups containing fifty-four rose diamonds and one table diamond. The total number of diamonds in the arches and acorns is one hundred and eight brilliant, one hundred and sixteen table, and five hundred and fifty-nine rose diamonds. From the upper part of the arches are suspended four large pendant pear-shaped pearls, with rose diamond caps, containing twelve rose diamonds, and stems containing twenty-four very small rose diamonds. Above the arch stands the mound, containing in the lower hemisphere three hundred and four brilliants, and in the upper two hundred and forty-four brilliants; the zone and arc being composed of thirty-three rose diamonds. The cross on the summit has a rose-cut sapphire in the centre, surrounded by four large brilliants, and one hundred and eight smaller brilliants.—Summary of Jewels comprised in the Crown: 1 large ruby irregularly polished; 1 large broad-spread sapphire; 16 sapphires; 11 emeralds; 4 rubies; 1363 brilliant diamonds; 1273 rose diamonds; 147 table diamonds; 4 drop-shaped pearls; 273 pearls."

Mr. Pole describes the interesting process of diamond-cutting:—

"The art of cutting diamonds into a regular shape is of comparatively modern invention; they

were long worn in their natural state, or only cleaned and polished. It appears, during the fourteenth century, some attempts were made to cut them into regular forms, but without any view to the improvement of their brilliancy; and it was only in the year 1456, that a certain Louis van Berquen, of Bruges, discovered the principle of cutting *facets* upon them, on which their lustre, as now known, so much depends. Cardinal Mazarin, about 1650, invented the perfect form of the brilliant, and had twelve large diamonds of the French crown cut into this shape, which has ever since been acknowledged the best possible for exhibiting the beautiful optical properties of the stone. Diamond cutting, in the present day, is almost exclusively done by Jews at Amsterdam, where large diamond mills have been established; and it is calculated that 10,000 out of the 28,000 persons of the Jewish persuasion living in that city are dependent directly or indirectly on this branch of industry. One of the largest establishments is that of Messrs. Coster, in the Zwanenburg Straat, who use steam-power to drive their machines, and employ from 200 to 300 hands. The process of cutting the diamonds is as follows:—The rough stone is first given into the hands of an experienced workman, who examines its natural form, and determines what general shape and size it can most advantageously be made to assume. Having settled this in regard to *two* diamonds, he beds each of them in a mass of cement placed at the end on a piece of wood of a convenient size for handling, and then proceeds to rub the two stones one against the other, on the principle of 'diamond cut diamond,' changing from time to time the parts acted on, and so bringing both stones gradually into the form he desires. The mutual abrasion of the two stones produces diamond powder, which is carefully preserved for the subsequent operations. When the diamond has received its general shape, it is sent into the mill to be finished, by cutting upon it the numerous small angular 'facets,' as they are termed, which make up the surface. This is done by exposing the stone to the action of diamond powder on a steel plate revolving with great velocity—an operation perfectly analogous to that of glass cutting, or the ordinary well-known lapidary's wheel. The cutting-plates are usually about ten or twelve inches in diameter; they are placed horizontally with their spindles vertical, and are made to revolve about thirty or forty times in a second; the part acting on the diamond travelling over the facet at the rate of about a mile in a minute. Diamond powder, of extreme fineness, mixed with the best olive oil, is placed with a feather upon the upper table of the wheel, and the apparatus is then ready for action on the diamond. The stone is embedded in a mass of soft metal, an amalgam of lead and tin, easily fusible, and yet hard enough to retain the stone firmly in its position; this is fixed in a moveable handle, which is again attached to a small frame. The workman, having first heated the metal to a soft state, beds the diamond in it in the required position, and fixes it there by plunging into water; the frame is then placed to project over the wheel, and the diamond, being downwards, comes in contact with its upper surface, on which the diamond powder is placed; weights are then applied, and the result of the friction, at the immense velocity, is to cut a facet upon the stone in a very short space of time. When one of these is finished, the workman softens the metal, extracts the stone, and replaces it in the proper position for making another facet; and here comes into play a very remarkable feature of the operation, namely, the accuracy of judgment which skill and experience give in arranging the faces of the stone. It is obvious that in any many-sided solid body, whose shape is to have any pretensions to regularity or symmetry, the different faces must not only all stand in certain definite angular positions in regard to each other, but must all bear a certain size in relation to the magnitude and form of the whole. Further, any one acquainted with geometry will know, that for a solid figure of fifty or sixty sides, the determination of these angles and surfaces by any theoretical rule would be a matter of great difficulty; while the attempt to make such a figure practically, by any one unskilled in the operation, would only lead to continual trial and error—attempts which, even if the thing were ever properly done at all, would waste a large portion in the operation, and consequently much diminish the ultimate available size. Any one who will try, for example, to cut a turnip or a potato, by his eye and hand only, into a regular octohedron, or solid figure of eight equal and similar sides, will at once appreciate the difficulty. Yet the diamond-cutter has to perform a much more difficult task, namely, to give about sixty symmetrical and regular faces to stones sometimes only about an eighth of an inch diameter, without any mechanical aids whatever to his judgment; and yet producing, without a particle of unnecessary waste, the very largest stone geometrically possible out of the rough body. This of course can only be the result of great skill and long experience. Having made one facet, he judges by his eye the exact angle at which the stone must be placed to cut the new one, and the exact depth to which the grinding for the latter must be carried; and so accurately is this done, that it is very seldom a good workman ever has to revert to a facet for correction, after he has once passed it over. The stone is so fixed in the metal as to leave other facets visible for constant comparison with the one under progress; and the handle is capable, by a sort of universal joint, of adjustment to any nicety for the position of the stone in touching the wheel. There is no further division of labour than between the rough cutter and the finisher—the latter taking the stone from the former in its roughed-out state, and returning it to the proprietor in the shape of the perfect finished brilliant ready for sale. The last touches to the facets consist of polishing, or giving to them the peculiar diamond lustre; but this is in nowise different from the grinding, except in being done with more care. The man can at any time adjust the weight or force with which the stone is pressed upon the wheel, or he can remove it entirely, and substitute the gentle pressure of his hand; and he can also modify the velocity of the grinding action; for, although the wheel itself is kept at a constant number of revolutions per minute, he can place the stone nearer to or further from the axis as he likes, which will of course give a less or greater effective velocity, according to the radius of the acting circle. The diamond powder, of which a large quantity is used, is obtained partly from the first process of rough-cutting the stones; partly from diamonds of a quality not good enough to cut for sale, which are broken up for the purpose; and partly from the newly-discovered substance, 'carbonado,' which is hard enough for this use, although of a somewhat coarse quality. The powder is carefully sifted, cleaned from dirt and extraneous matter, and, when about to be used, is mixed with the finest vegetable oil. The workmen are all Jews, and are regularly educated to the trade. They are paid by piece-work. Formerly, they did their work at their own houses, their wheels being turned by manual power; but it is now found more advantageous for the large proprietors to provide workshops of their own, furnished with steam power, for the use of which the men pay out of their earnings. Some of the more skilful and industrious men realize considerable incomes."

The "cleavage" of the diamond is also well described:—

"Although the diamond is so hard, it is very easily broken; and, indeed, by a particular knack, it may even be cut with a common penknife. This apparent anomaly is due to what is called its *cleavage*, a result of the crystalline structure. Many well-known substances—as slate, for example—split or cleave with peculiar facility in certain definite directions, while they offer considerable resistance to fracture in all others. The diamond has this property, cleaving easily in no less than four directions, parallel to the surfaces of the original octohedric crystal; and therefore, when moderate force is applied in either of these ways, the stone splits into pieces. Pliny, mentioning the great hardness of the diamond, states that if laid upon an anvil, and struck with a hammer, the steel would sooner give way than the stone. This assertion is a matter of popular belief in the present day, but we would not recommend any possessor of a good diamond to try the experiment. The chances of some of the forces acting in the cleavage directions are so great, that the stone would in all probability fly to pieces under the first blow. The truth is, that Pliny referred not to the diamond, but to the *sapphire*, which, though less hard than the diamond, cleaves only in *one* direction, and might, therefore, withstand the test named. The cleaving property of the diamond is made useful in two ways in the manufacture: first, by splitting the stones when they contain flaws, and, secondly, in the preparation of diamond powder. When a rough diamond is seen to contain a defect of sufficient extent to depreciate its value as a single gem, it is split in two, precisely at the flaw, so as to make two sound stones. This is a very simple operation in appearance, done in a few seconds, but it requires an amazing amount of skill to do it properly. The workman, by a sort of intuitive knowledge, gained by long experience, knows, on a careful inspection of the stone, the exact direction which a cleavage plane passing through the flaw will take. Tracing this plane, therefore, to the exterior, he makes on the edge of the stone, precisely in that spot, a slight nick with another diamond. He then places a small knife in that nick, gives it a light tap with a hammer, and the stone at once cleaves in two, directly through the flaw. This operation, in daily practice in the Amsterdam works, is one of the most elegant and instructive processes in the whole range of mineralogy. It is reported that Dr. Wollaston, celebrated as almost the originator of the science of crystallography, once made a handsome sum by purchasing a large flawed diamond from Rundell & Bridge at a low price, and subsequently splitting it into smaller sound and valuable stones, the principle of the operation not being then generally known."

Mr. Pole's little reprint makes very capital reading for an idle half-hour.

Hell, of Dante Alighieri—[*L'Inferno, di Dante Alighieri*, colle Figure di G. Doré]. (Paris, Hachette & Co.)

HERE is what may be styled a volume royal, folio, broad margined, luminously printed upon the purest paper, and edited, with care, from the Cominian text, which, assumed to be the best, has, without servile obsequiousness, been adopted, say the editors, as the foundation of the present version. M. Gustave Doré illustrates the marvellous poem. The designs are, in one form or other, not unknown to the world, several of them having been exhibited in Paris during the current year. M. G. Doré is qualified to illustrate Dante, but in a pictorial manner, as distinguished from the severe and sculpturesque method of Flaxman. M. G. Doré can hardly be said to satisfy the demands on a pictorial artist of the highest grade, because he deals with no more than two complete qualities of true Art; chiar-oscuro and composition. Colour—such as may be expressed in black and white—there is barely any in his work. Drawing, beyond mere expressiveness, none. Expression, such as is given to the features, is seldom to be met with; but the purport and energy of his designs are mostly wrought out through attitude and action—the auxiliaries of expression. Great as he is in these matters, the want of facial expression leaves his works imperfect in that essential point—so we say that his designing is almost invariably based upon chiar-oscuro and composition only in completeness. But in these directions he is a master indeed,—so much a master that he seems to care for little else, and, like a musical composer who is fond of a peculiar movement, often forgets that he has repeated an effect many times, so that we weary of it now and then; and in the hastiness of a popular judgment the artist gets much less applause for originality and variety of power than he really deserves, because casual observers do not discriminate

very delicately, neither do they allow for the somewhat limited scope of the artist's speciality. What he can do within its range is what we have to judge him by. So far as the above-mentioned picturesque elements of Art can give success, beyond all doubt the series before us forms a memorable triumph, showing the designer to be a great artist. Far below the epic spirit of Flaxman's series, these works fascinate by the very profuseness of imaginative power they display. Where almost a special education is needed to appreciate the glory of our countryman, the telling, bold and dramatic compositions of M. G. Doré will obtain admiration from a wide circle. Thousands, who would look upon a grave outline by Flaxman with only acquiescent admiration, or with the indifference proper to an ignorant regard of an antique bas-relief, which they are only *told* is fine, will go down in fancy with the living artist into the shades of Hell, and be so impressed by his photographical vigour that they may even know how "in the thinking it reneweth fear" to have once seen such monstrous shadows, sullen flames and dismal regions.

The designs before us are seventy-six in number, engraved of an uniform size of about nine and a half by seven and a half inches—that is, somewhat larger than the mass of type on this page,—are excellently reproduced by the graver, and their varied effects are rendered with great success—no small matter in a series of such importance, wherein effect forms the principal means of expression. The number, size and variety of the works give a striking idea of the immense labour they must have cost the artist, facile as he is. Of the seventy-six designs, we shall select those which most fitly characterize the merits and faults of the whole, employing for the quotations the admirable literal blank-verse translation of Mr. W. M. Rossetti. The portrait of the poet, facing the title, is extremely bad, and most unworthy of the series. The meeting with the Panther (the type of lustful Florence), who crouchingly faced Dante on his way over the stark hill-side, is given with expressive effectiveness. The ground is rocky at the front, where Dante treads; before him, upon a slope that the early light of dawn breaks on, is the crouching she, lithe, agile, threatening:—

> A panther, light and swift exceedingly,
> And which was covered with a spotted hide:
> And from before my face she would not go;
> Nay, rather, she impeded so my path
> That I was many times turned to turn back.

—Beyond is a darkling cliff, that looks out on a murmuring sea, lapsing amongst rocks, sped over by great winged birds; while the light of a pallid dawn is upon a world of cloud-edges, cumuli and strata, and falling most strongly on the beautiful beast, about whose motions a ghastly shadow clings, deepens the terror and increases her bulk. Those who remember the combat of the Knights in 'Janfry the Knight and the Fair Brunisende,' illustrated some years ago by this artist, well know how marvellously he can manage an accidental shadow.

There is much expressive treatment of light and variety of tone and surface in the design which shows the result of the appeal to Virgil:

> Thou only art the one from whom I took
> The lofty style which won me honouring.
> Behold the beast because of which I turned:
> Do thou against her help me, famous sage,
> Because she makes me tremble, veins and pulse.

All artists will look with delight upon the exquisite manner in which the absorption of all substances in one level of grey tone has been expressed in the starry effect of 'Lo giorno se n'andava,' which is also a successful rendering of the silent brilliancy of the multitudinous stars studding the sky, with the clear, sharp, thin moon and sleeping bars of cloudy fleeciness that lie over the edge of her sickle-like form. Not less will painters praise "I that do make thee go am Beatrice"—the appearance of the lady to Virgil when he was "among the spirits in suspense" in the land of darkest dusk. The artist has put a great radiance round the lady, "blest and beautiful," which shimmers in the region's twilight, revealing trees and heaped foliage, that would otherwise only tell differently dark against the sky. The wall-like ravine of the descent into Hell's vestibule looks grand and grave, and is lighted by the brightness which shines beyond, and transfigures into a fairy land the great distance seen over the ridges of the wave-like hills. The compulsion into Charon's boat upon the "lurid river" is full of action, and eminently expressive. We admire Dante and Virgil standing upon a rocky peak looking on the legions of the Lustful, whose multitudes pervade the air through and through with their numbers, and sweep into surging curves upon curves in an endless line, that wavers in the "infernal hurricane which never rests":—

> And, as the cranes go chanting their outcry,
> Making a long line of themselves in air,
> So saw I coming, uttering forth wails,
> Shades carried by the aforesaid vehemence.
> Wherefore, I said, "My master, who are these
> People whom the black air chastiseth so?"

Among these, of course, is Francesca. The composition, in the second design illustrating this section, of her figure with that of Paolo as they drift in the mastering wind, is extremely beautiful—so beautiful, indeed, that the unpleasantly plump and too much rounded forms of the nude figure are at first disregarded. Drawn with more elegance, this design would bear comparison with any of the splendid works which have illustrated its theme. Notwithstanding a certain richness of execution, the drawing to "Further that day we read in it no more," Canto v., v. 138 (Francesca's last words), is melo-dramatic, and does not represent the text literally. Then comes the interview with Ciacco, Canto vi., v. 36, where the Two are stepping through the rain of the third circle:—

> Over the shades the heavy rain subjects
> We two were passing, and we placed our soles
> Upon their vanity which seemeth form.

This is one of the finest designs in the whole series, and not the less so because the artist has not recourse to his unrivalled, but somewhat overwrought, felicity of atmospheric expression and effect of chiar-oscuro, but rather depends upon the more noble faculties of action and attitude to express his feeling. The Two are stepping and half-stumbling on the field amongst the writhing souls of men and women, some of whom are knotted in convulsions,—some grovelling on the plain,—some roaring in agony at the passers-by, as prone they drag themselves after,—some women in their great woe pull their long hair backwards, with arms outstretched in the rigour of fearful pain,—some, supine, beat the earth with their shoulders, tossing from side to side, while the pitiless hail comes down over all. The ceaseless labour of the Avaricious and the Prodigals in rolling stones and bags of gold is another design, in the same spirit as the last; the hoisting, thrusting, striving, and all the mighty struggles against the weighty masses, are finely expressed. As a piece of composition, this is admirable. We notice that in more than one design the artist has added little circumstances to the text, to explain its meaning or aptly illustrate his own thought. Here, the bags of gold that are being upheaved with such toil are so introduced, not being suggested by the poem. Moreover, the "tonsures" upon which such stress is laid by Dante are not observable either here or elsewhere, whence we infer that M. Doré dissents from the storming sarcasms hurled at the Papacy and the monastic orders by the poet.

There is not a finer design in the whole series than that which shows the melancholy line of the leaden-cowled Hypocrites, defiling along a mountain-pass before the Two, who stand above them on a little knoll. This is impressive in its extreme simplicity. White-robed, the heavy-weighted ranks pass along in solemn order, amongst the black hill-sides, and, wavering, thread the winding road; they are burthened and bowed down; some turn as they pass the Two, and painful faces lour beneath the cowls. The repose of tone and chiar-oscuro throughout this is remarkable, and contrasts advantageously with a certain sameness of effect observable in parts of the series. Where Dante and Virgil look into the Pit of Evil Counsellors (Canto xxvi., v. 46-7, 81) is an example of the employment of the like effect to that we noticed in speaking of Farinata's fiery tomb. The Two stand upon a ledge of rock, that winds along the face of a vertical cliff; they look downwards into the gulf below, and much impressiveness is gained by the bickering shadows that rise behind and point upwards upon the rocky wall. In the Pit of the Alchemists, Dante sees his relative, Geri del Bello. Contemplating his own visage, that is within his hands and resting on his knee, the figure of Geri has a mournful and horrible vigour in its design which tells well.

THE GORILLA.

At Manchester Prof. Owen made some statements about the Gorilla, recently acquired for the British Museum, which led to a reply from Dr. Gray. Dr. Gray's letter, impugning the accuracy of Prof. Owen's statement of facts, was read in the Section of Zoology, and produced a considerable sensation. Prof. Owen had left Manchester when this paper was read; but on receiving a copy of Dr. Gray's communication, he wrote an explanation to the President of the Section of Zoology, which explanation arrived too late. Prof. Owen has now sent it to us for publication; and that the reader may have the whole matter under his eye, we shall transfer Dr. Gray's letter from our Sectional report to this column. The correspondence will then explain itself.—

Dr. Gray to Prof. Babington.

British Museum, Sept. 6, 1861.

My dear Professor,—It is with much regret that I feel myself called upon to correct an error which appears in the report of Prof. Owen's paper on the

Gorilla, &c., contained in the *Times* of this day. Prof. Owen is there represented as stating, that "the skin of the great male Gorilla, now in the British Museum, exhibits two opposite wounds, the smaller in front of the left side of the chest, the larger close to the lower part of the right bladebone. Two of the ribs in the skeleton of this animal are broken on the right side, near where the charge has passed through the skin in its course outwards." As this would appear to offer a direct contradiction to a statement made by myself, I cannot (although labouring at present under a severe attack of illness, and writing from a sick chamber,) pass it over in silence.

My attention was called to the subject by Mr. Joseph Beck, the well-known microscopist, who first made the observation, that none of the skins of the Gorilla exhibited by Mr. Du Chaillu offered any evidence of having been shot in the fore part of the chest, as invariably stated in his 'Narrative.' My own examination entirely confirmed this remark; and the unanimous conclusion of numerous sportsmen and men of science, who have since examined both skins and skeletons, has been to the same effect.

The skin and skeleton, referred to in Prof. Owen's paper, are both, as stated, in the British Museum. While the skin was being stuffed at the Crystal Palace by Mr. Wilson, I paid a visit to that establishment, in the company of Mr. Grove, the Secretary, and several friends. I then inquired of Mr. Wilson whether he had observed any bullet-hole in the chest, and he stated that he had not, but pointed out to me two holes in the nape of the neck (now filled with putty); there are also two large holes in the thin portion of the hinder part of the skull belonging to the same skin which pass through the bone, and are quite sufficient to have caused death. In neither skin nor skeleton is there any evidence of a gunshot entering on the left side of the chest; and the fracture of three (not of two) ribs on the right side beneath the scapula, and the supposed corresponding rent in the skin, are so utterly unlike the effects of a gunshot, that no sportsman could possibly so consider them. These facts so easily verified that I trust all who feel interest in the subject will examine and decide for themselves. I might cite many names of high authority in corroboration of what I have here advanced, but I am not disposed to appeal to any authority, however great, where the facts are open to the inspection of all. On these, and these only, I rest my case.

I shall be obliged by the reading of this letter in the Natural History Section, and remain yours faithfully, JOHN EDW. GRAY.

Prof. Owen to the President of Section D.

Sheffield, Sept. 11th, 1861.

Sir,—Having just received the *Manchester Examiner* of the 10th inst. containing the letter from Dr. Gray on the death-wound of the large Gorilla, I lose no time in making that reply which I should have submitted to the Section, had I been present when it was read. To the remark, that "the fracture of the ribs, and the supposed corresponding rent in the skin are so utterly unlike the effects of a gunshot, that no sportsman could possibly so consider them," I answer, that the hole or rent in question is conspicuous; and that a gentleman who combines an acuteness of observation which has placed him high in science, with a well-known reputation as a skilful marksman and deer-stalker—Sir Philip Grey Egerton—concurs with me in the opinion that the hole or rent in question does present the characters of the one by which the ball escapes in an animal so killed. The wound by which the ball penetrates is much smaller; for the living skin contracts, and the difference of size in the opposite wounds plainly indicates the course of the bullet. As to the ribs, their intervals are wider in the front than at the back of the chest: a ball might enter in front without impinging on the rib or its cartilage, and it would be between the eighth and ninth cartilage, or below the latter, according to the state of the breathing of the Gorilla at the time, where the ball entered in its way obliquely upward and to the right, according to my observation of the contracted aperture, distinctly manifested in the skin before it was sent to be stuffed. At the back of the chest, the ribs, where they bend outward and forward, are so close together as almost to overlap; a ball would most probably impinge on the contiguous parts of two, and a slight glancing movement—common in gunshots—might affect a third contiguous rib. No one can look at the back part of the thorax of the Gorilla without seeing there the conditions under which such fracture as the right ribs exhibit, from within outwards, might take place, as the effect of a gunshot wound through the chest. As I, and all who have had the pleasure of accompanying Sir P. Egerton in the deer-forest, must hold him to be a sportsman, the asseveration, therefore, that "no sportsman could possibly consider the fracture of the ribs, and corresponding rent in the skin, as the effect of gunshot," must pass into the category of many other assertions aimed at the character and reputation of M. Du Chaillu. The holes in the skin of the neck were mere slits made by the knife, after the death of the Gorilla, probably in the act of flaying, and removing the skin from the long projecting cervical spines; those holes showed no mark of contraction of living skin, like the wound in front of the chest.

RICHARD OWEN.

M. DU CHAILLU AND HIS BOOK.

THE following letter, from Mr. R. B. Walker, of the Gaboon, appeared in the *Morning Advertiser* of Monday last. Some excisions had been made for the sake of greater courtesy to M. Du Chaillu. We have ourselves omitted some sentences of Mr. Walker's text as we find it in our contemporary, having the strongest desire to avoid mixing up personal matters more than is necessary with the question of accuracy as to scientific facts:—

Gaboon, West Africa, July 22, 1861.

M. Du Chaillu, in his letter which appeared in the *Times* of May 22, in reply to what he somewhat contemptuously terms the "cavils" of Dr. Gray, having ventured to refer that gentleman to his (M. Du Chaillu's) friends in Corisco and Gaboon, and to the missionaries and traders in general, it appears to me that to remain silent after such a challenge would be an unpardonable act of complicity on their part. Therefore, as a trader in this river and the neighbourhood, of ten years' standing, I take up the gauntlet he has so recklessly thrown down. I trust to your impartiality to give insertion to this letter, in which I will point out a few only of the most glaring and gross of his numerous false statements and exaggerations, which have struck me on a careful perusal of his so-called 'Explorations in Equatorial Africa,'—which work is neither more nor less than an amusing fiction,—in which the author, knowing the improbability of finding speedy contradiction in England, has given full scope to his apparently very fertile imagination. Were this work to be allowed to pass undisputed, not only might the confiding public in general, but the scientific world in particular, suffer by too readily accepting as *bonâ fide* the "traveller's tales" with which it is replete.

Having known M. Du Chaillu for some years personally, and possessing, moreover, from reliable sources, information the most exact as to his antecedents, besides having a knowledge of many of the places and people which he pretends to describe, I am induced to request a place in your journal for the following remarks.

M. Du Chaillu has stated that he found piles of human bones in the F'an (properly, F'an *pl.* Ba F'an) towns which he visited. I do not pretend to have been in the particular towns or villages which he mentions, and which probably have no other existence than in his own imagination; but I have twice visited the Ba F'an country, living in one of their towns for four days at a time, besides making shorter stays in some eight or ten others, one of which, situated about 120 miles from the mouth of this river, contains about 3,000 inhabitants, and I never saw the slightest vestige of human remains in any of them, nor did either of the two Europeans, or of the numerous natives of Gaboon and Kroomen, by whom I was accompanied, although we looked for them. I have made inquiries of all white people, whether missionaries, French officers, or traders, who have made excursions into any part of the country inhabited by the Ba F'an, but not one of them (with the single exception of an American missionary, who has been in communication with that people for many years, and speaks their language) ever saw a human bone or other remains, and the gentleman in question only came across a single skull planted in the ground in one village,—an object to be met with elsewhere in Africa than in the towns of the cannibal Ba F'an. That these people are notorious anthropophagi, no one attempts to deny; but the "piles of human ribs, legs, hand-arm bones, and skulls," are inventions of M. Du Chaillu.

Again, the statement of the untameability of the young of the Gorilla, or N'Jina, is untrue. In proof whereof, let me ask M. Du Chaillu, whose memory, usually so very good, seems to have failed him signally in this particular instance, if he has forgotten the young female Gorilla, of from two to three years of age, called Seraphine, which lived at my factory for four months in 1859, and which he repeatedly saw there? I assert, without fear of contradiction by M. Du Chaillu or any other person (and I could name scores of Europeans who saw it), that this animal was perfectly tame, docile, and tractable,—far more so, indeed, than many negro children of the same age. Not only was she on perfectly good terms with all grown-up people in and about the factory, but was exceedingly attached to her keeper Curtis, whom she could not bear to be out of her sight, but regularly accompanied him about the factory and in his walks in the town and neighbourhood. She was familiar and quiet with myself and clerks, and was only displeased when children approached her; and for these she seemed to have, in common with most large apes and monkeys, a very great dislike. She was seldom tied up, and even then only by a very small cord, which she could easily have broken, or cut with her teeth had she felt so inclined. She allowed herself to be clothed, seeming to like it; and actually went to breakfast with a friend of mine, M. Barbotin, commandant de l'Aviso à vapeur, le Rénaudin; upon which occasion she conducted herself to the admiration of everybody. When at times put on the table, or amongst vessels of glass or earthenware, she was most careful not to break anything. She finally died from dysentery and chagrin,—the latter caused by her keeper being prevented by his other occupations from paying her so much attention as she had been in the habit of receiving.

M. Du Chaillu ignores totally the presence of M. Duval, who accompanied him in his trip overland to Cape Lopez, and likewise omits all mention of an American trader living close to him on the Fernan Vas, to whom he was under many obligations.

The species of ant to which he gives the name of "barhekouay"—a word unknown in Mipongwe, and probably invented by himself,—is the insect commonly known as the "driver," of which there are two kinds, called here respectively ntyounou and ntyounou sakoa. I need scarcely say that his description is a gross exaggeration: the insect, although sufficiently troublesome, being by no means so formidable as he represents it.

In the Appendix to his work, M. Du Chaillu mentions a visit paid by him to a French emigrant ship at Cape Lopez: no ship of the kind ever shipped a single emigrant there, or even called there. The vessel to which he alludes was the Phœnix, Capt. Chevalier, on board of which he accompanied me; and it was through me that he obtained permission to go, when he heard of my intention. So far from his being there able to hold intercourse with the people on board, as his boasted knowledge of the different native languages should have enabled him to do, he could hardly speak half-a-dozen words correctly, and was glad to avail himself of the services of Curtis, then interpreter to Capt. Chevalier, who furnished him with the numerals of the Kioo and other tribes to the north-west which figure in his Appendix; and I was the medium of communication with those emigrants speaking the Mipongwe. As to M. Du Chaillu's qualifications in this latter language, they are of

the most infinitesimal kind, as I can assert with confidence, having a competent knowledge of it myself; and he abundantly proves his ignorance when employing any Mipongwe words, nearly all of which are wrong. His Mipongwe numerals are totally incorrect. He has even less knowledge of the dialects of the neighbouring tribes. As to his identification of individuals of thirty-eight different tribes on board the Phœnix, nothing of the kind occurred; and his information must have been obtained from Capt. Chevalier, or the French Délégué.

In his engraving, the horns of "niare" are simply *à l'impossible*: this animal is certainly the "bush cow" of Dr. Gray, the native name for the animal (nyare-iga) having literally that signification.

Dr. Gray is also correct in his surmise that the specimens were not prepared on the spot. I saw many of them in the "rough": they were prepared in New York; the operator finding them in such a bad state, as to cause him to say that he would not undertake the task again for 100 dollars per specimen.

With regard to the engravings which M. Du Chaillu alleges to have been prepared, with a few exceptions, from his own sketches, how does it happen that he had no sketches before leaving here, and actually told me that he could not sketch?

I think I have sufficiently shown that M. Du Chaillu has been guilty of many incorrect statements—in fact, his work contains nearly as many errors and inaccuracies as there are paragraphs. It is, moreover, teeming with vanity; and, taking it as a whole, it is hard to say whether the author, in his attempt to impose upon and in fact humbug the scientific world, displays most mendacity or ignorance. I will proceed, with many apologies for so far trespassing on your space, to give an instance of downright untruthfulness which occurs in the concluding paragraphs of the book. M. Du Chaillu there states, that after languishing for four months at Camma, waiting for a ship, his sight was at length gladdened by the appearance of a vessel, which came to an anchor off the mouth of the Fernan Vas, being sent by his friends in Gaboon, the captain having orders to ascertain how he came by his death. Now, not only had his death never been reported,—and if it had, he was far too insignificant for any one to send a vessel to inquire into the manner of it,—but he had actually only left Gaboon some fifteen or twenty days previously, after having made arrangements with the very same captain to follow him to ship his ebony, &c. for America; and the four months were actually spent in Gaboon and the neighbourhood, two of them with a member of the American mission, who proceeds to England by this same mail *en route* to America, and who can confirm my statement. This gentleman may be heard of by application at the American Consulate at Liverpool.

I, in common with most persons, doubt that M. Du Chaillu ever killed or assisted to kill a Gorilla, and also of the extent of his "travels." At any rate, his estimate of distances, as well as the direction in which he pretends to have penetrated, must be received with the utmost caution, as not only was he unprovided with instruments, but ignorant of their use.

As indorsing my opinions, I am authorized to mention the name of M. Labeguerie, a French merchant here, and a distinguished member of the Agricultural Committee; to which I venture to add that of my friend M. A. Michon, of Havre, who could furnish information on the subject of his "travels," &c. * * *

Having thus, as far as time will permit, done my best to arrest a career which I leave others to characterize, I am, &c., R. B. WALKER.

THE MESSRS. SCHLAGINTWEIT.

Royal Gardens, Kew, Sept. 16, 1861.

IN your article respecting the appointment of the Messrs. Schlagintweit, I am called upon to say whether I did more than suggest how those gentlemen might be usefully employed in India; and I beg, therefore, to state that I was nominated to the Sub-Committee, whose duties are defined in General Sabine's letter to Sir Roderick Murchison, *after the appointment of one of the Messrs. Schlagintweit (Adolphe) had been made* by the East India Company. I may further state, with regard to the part taken by the Royal Society respecting that appointment, that I was present at the Council Meeting of the Society when the proposal was announced, on the part of the East India Company, to employ *one only* of the Messrs. Schlagintweit, in completing the Indian Magnetical Survey,—that I have a very distinct recollection of the surprise and concern expressed by several members of the Council (including one most distinguished Indian officer), that the Court of Directors should overlook the claims of many competent and deserving scientific men of their own service to be employed upon this duty, including military and civil servants of all ranks and qualifications, and the staff of the grand Trigonometrical Survey of India; and that it was resolved that the Council should confine their answer to a recommendation of the Survey in question being completed. Of the subsequent appointment of not *one*, but *three* Messrs. Schlagintweit to this duty (two after my appointment to the Sub-Committee), I know nothing; nor, in so far as I am aware, had the Council of the Royal Society any part in it. On my appointment to the Sub-Committee in question, I did my utmost to further the objects of the Schlagintweits' expedition to India, in the way of advice, encouragement, and introductions to my Indian friends; and on the appearance of the first hostile comments on their appointment, I did what I could to render their position in England as little invidious as possible, feeling that they were not the parties to be blamed, and hoping that the results of their expedition might justify the expectations entertained by many as to their ability.

I have to add, that the contrast made by the Indian authorities in their treatment of the Messrs. Schlagintweit and of several distinguished Indian officers,—who, having spent their private incomes in the pursuit of science in India, and being then in England, were neither offered the Magnetic Survey, nor allowed the small sums they asked to publish researches which are of infinitely higher value than those of the Schlagintweits, and made in the same countries which they visited,—did, from the first, excite my deepest indignation.

The Magnetical Survey of India, in particular, was begun and carried on by Indian officers for many years with the highest credit to themselves; it was suspended by the Court of Directors (owing to Capt. Elliot's death), when all but completed; and the subsequent appointment of other than Indian officers to complete the operation, was as unjust as it has proved impolitic.

J. D. HOOKER.

ON THE GREAT SOLAR ECLIPSE OF JULY 18, 1860.

By the Astronomer Royal.

ON Monday evening, the 9th of September, Prof. Airy delivered a Lecture to probably the largest audience ever assembled to listen to a scientific discourse. The place of meeting was the Free Trade Hall, Manchester; at the doors of which the members of the British Association began to assemble at half-past six o'clock, and so rapidly did the vast building fill that all the seats in the body of the hall and the galleries were occupied within half-an-hour of the opening of the doors, and long before the commencement of the lecture there was scarcely standing room in any part of the building. A few reserved seats in the body of the hall were kept for the Presidents and Vice-Presidents, and Committees of Sections and their friends, and a vacant space in front of them was reserved to afford access to them. Some of the audience who had not been early enough to secure seats evinced displeasure at the space being unoccupied, and attempted to force the barrier, thus causing an interruption, which prevented the Astronomer Royal from continuing his discourse. The Local Secretaries, to whom the Association was throughout much indebted for their admirable arrangements, had, however, taken the precaution to have chairs placed in readiness to fill up the vacant space, so that accommodation was soon afforded to the discontented, and Prof. Airy then proceeded with his lecture, which was listened to throughout with profound attention.

Prof. Airy commenced by stating that, although the main object of his communication was the description of the great Solar Eclipse of last year, it would be desirable for him to say something about eclipses generally, and he would then more particularly describe some of the phenomena which had been observed on the occasion of the eclipses of 1842 and 1851, in order to render clearer the particular points he desired to bring under notice with respect to the Eclipse of 1860. When mankind first began to observe eclipses of the sun, it was not difficult for them to make out that the light of the sun was eclipsed or shut off from view by the interposition of the moon; and as attention was more and more directed to the subject, it became evident that the phenomena of an eclipse could not be accounted for on the supposition that the moon and the sun were bodies in close proximity one to the other. The effects of parallax became apparent, for the position of the moon on the sun's disc was found to be different for different observers situated at sufficiently distant points on the earth's surface, and it was then seen that the moon must be very much nearer to the earth than the sun, and that sometimes both the sun and the moon were nearer to the earth than at other times.

In order to render apparent to his audience the movements of the moon round the earth and the earth round the sun, and the results of such motions, the Astronomer Royal called attention to an enormous Orrery he had prepared. The sun was represented by a large ball, around which the earth was carried on an arm supposed to move in the plane of the ecliptic; the moon's orbit was represented by a hoop inclined to this plane about 5°, and the speaker showed that, as he caused the earth to revolve round the sun, the plane of the moon's orbit retained its parallelism in space; which was actually what appeared to occur in nature if the observation were continued only for a short period; but a longer period of observation would show that the plane slowly revolved, and that in about 18$\frac{6}{10}$ years the nodes or the points of intersection of the moon's orbit with the ecliptic completed an entire retrograde revolution. This motion was shown to the audience by causing the plane of the model-orbit to rotate on the arm carrying the earth; and also it was pointed out that the earth was not situated exactly in the centre of the moon's orbit, so that as the moon revolved she approached to or receded from the earth, in consequence of which she subtended sometimes a greater, sometimes a less, angle to an observer. Now the line joining the apogee and perigee of the moon's orbit (the line of apsides) did not retain a fixed position, but on the contrary it slowly revolved and completed its revolution in about 9 years.

The speaker then showed that in order that an eclipse of the sun could take place, the sun and moon must be in conjunction, that is, as regards an observer on the earth, they must occupy nearly the same position in the heavens; he also pointed out the limits as to distance of the moon from her nodes where a partial eclipse would be possible, and also the joint effect the earth's position and the moon's position in their respective orbits in determining the extent of an eclipse when central, which might either be annular, or total without continuance, or total of longer or shorter duration. There was a recurrence in eclipses of a singular nature known to the ancients, which enabled them to predict eclipses in a rough way, but with a fair amount of accuracy. It so happened that in 223 lunations, which occupy eighteen common years, fifteen days, eight hours, eclipses both of the sun and the moon recur almost precisely in the same order. So that if a total eclipse occurred at any time, another total eclipse of the same character would occur eighteen years, fifteen days and eight hours afterwards; but in consequence of the period not including an exact number of days, it would be evident that if the first eclipse were visible in the forenoon, the second would occur in the afternoon, as a different part of the earth would be turned towards the sun.

This period of 223 lunations was called *Saros;* and it is interesting on account of the connexion between the eclipses of 1842 and 1860.

Total or great eclipses, being remarkable events likely to arrest attention, are most valuable in chro-

nology, for the places of the sun and moon are known with great accuracy, and although minute errors of the moon's place when multiplied by long periods affect the determinations to some small extent, the moon's place is known too accurately for it to be possible to make an error even approaching eight hours, in the occurrence of the earliest eclipse on record; and an error of eight hours, he remarked, would have the effect of altering a date by the period of a Saros or eighteen years, but such an error was quite impossible in the present state of science.

On the last day of the present year there will be another total eclipse, the line of totality crossing Africa, and traversing the Great Desert, Tripoli, and the Mediterranean Sea, therefore not very favourable for observation, but perhaps some of his hearers might wish to see it. There will be a more favourable eclipse in the south of Europe in 1870.

There was an appearance which had been observed on the occasion of eclipses, to which he would now draw attention, but which he would soon dismiss altogether; he alluded to the so-called Baily's beads. When the sun was much obscured, as, for instance, just before its total obscuration and just after its re-appearance, the sun's limb was seen broken up into bright spots interrupted by black spaces like a string of beads. Several observers had made mention of this phenomenon; but he had no respect for the accounts of it, as in the speaker's opinion it arose from the view of portions of the sun's limb between the mountains of the moon either with bad telescopes, or with telescopes out of focus. He had never seen this phenomenon himself, and he believed that his friend the late Mr. Baily, who first called attention to it, must have had the misfortune to use a bad telescope.

In the year 1842 there was a total eclipse on July the 8th, which was visible in the south of France and Italy. Two Englishmen left England to observe that eclipse, namely, Mr. Francis Baily and the Astronomer Royal. Mr. Baily observed at Pavia, and the Astronomer Royal made his observations on a hill called the Superga, near Turin.

The speaker said that on the Superga he saw for the first time a total eclipse in all its grandeur, and, he would add, in all its horror. Nobody who had not witnessed the phenomena of a total eclipse could form the least conception of the scene actually presented. To however great a degree the disc of the sun may be obscured in a partial eclipse, yet no idea can be formed from it of the phenomena of a total eclipse.

The obscuration is not similar to that witnessed on any other occasion; it does not in the slightest degree resemble that of a cloudy day. On a cloudy day the darkness is general, and the feeble illumination is pretty generally distributed, whereas at a total eclipse the light is concentrated on one spot, like a single light within a vast dark room; near the horizon a peculiar colouring is visible, which is seen on no other occasion. And the vast and mighty shadow of the moon may be seen approaching, and its contour marked with such clearness that the involuntary exclamation, "It is coming!" will be heard to escape from the lips of the bystanders. Then one instinctively turns towards the spot where the sun had been observed to disappear, and there is seen the dark moon as a patch surrounded by a halo of light—the "corona"—which is frequently represented of the most fantastic forms by observers. It is extremely difficult to estimate the exact amount of light at the time of totality, but in the speaker's opinion it was about equal to that when the sun is about 7° below the horizon. One observer of his party, in 1860, had noticed that the corona cast shadows from objects; notwithstanding this amount of light, it was extremely difficult to see where to walk, and he had been informed that pigeons could not find their way to their homes.

There were appearances seen during the eclipse of 1842 for which none of the observers were prepared, for on viewing the dark moon through their telescopes, astronomers saw certain red flame-like protuberances apparently shooting out from the moon. What could they be? They were seen by several persons, and no doubt could exist as to their reality, although certain discordances arose in the accounts respecting them of the several observers. Astronomers could make nothing of these flames. As they were unexpected, no provision had been made to determine their angular positions, and no probable conjecture could be made as to their real nature. One observer for a long time disturbed the astronomers by declaring that he had seen such red flames on the face of the moon; and it ultimately transpired that he had been looking at the sun with a common opera-glass magnifying four times, and in which irradiation would account fully for what he fancied he saw.

These flame-like protuberances were noticed by Capt. Stannyan, who observed the total eclipse of 1706 at Berne, and more distinctly, by Vassenius, on the occurrence of a total eclipse visible at Gottenburg on the 3rd of May, 1733; the flames at the latter eclipse were not in immediate contact with the moon, but near it. The account of this eclipse was printed in Latin in the *Philosophical Transactions* of the Royal Society, and had not attracted attention.

The Astronomer Royal stated that he would now make some remarks respecting the eclipse of 1851, which would apply equally to that of 1860. It would be recollected, from what he had just said, that all remained in uncertainty, in respect of the nature of the red flames, since 1842; and that it became desirable, on the occurrence of the eclipse of 1851, to clear up these doubts by previously-arranged plans of observation. The speaker then pointed out the differences between the results in a science like Astronomy, which was dependent upon the self-possession of observers, and the more precise results obtained in experimental science. The difficulty of reconciling the various statements was such that few persons are aware of the qualifications necessary for the astronomer who undertakes the task; he must, as well as scientific acquirements, possess the qualifications of a police magistrate, and of one who, moreover, has become familiarized with the symptoms of nervous disease.

The discrepancies in the various accounts are not to be wondered at when it is remembered that the persons who make the observations have to travel possibly many hundred miles, perhaps in personal discomfort; at all events, they do not feel so much at their ease as if they were in their own country. Then the phenomena of totality are over in a few minutes; so much had to be done in the time, that there was great difficulty in confining one's attention to the one set of observations previously determined on. If it is difficult to control oneself, how much more difficult is it to command the strict attention of others who are to assist! He recollected, in M. Arago's account, that the trained officers of a French vessel of war totally forgot all discipline under similar circumstances.

In 1851 several observers left England to observe the eclipse, the English astronomers distributing themselves chiefly in Norway and Sweden. The Astronomer Royal was stationed near Gottenburg, and made three drawings of the red prominences at different periods of the eclipse.—(These were represented on immense diagrams, and were explained by the speaker.)—There was visible on the apparent left of the moon a small mountain-like peak, and on the right another similar prominence, as well as a curious hooked protuberance, which the speaker had called a bomerang, and a cloud-like formation quite detached from the moon's limb. The second diagram showed the covering of the left-hand prominences, and the uncovering of the right-hand prominences; whilst the third exhibited, at the lower right-hand portion of the moon's limb, a long line of new protuberances, revealed by the onward progress of the moon from right to left. Very various indeed were the representations of these protuberances by other observers. Some made the bomerang straight, some crooked; some thought that it changed from straight to crooked, and some from crooked to straight. The accounts of the three observers (Pettersen, Chevallier, and Airy), in the single town of Gottenburg, were as discordant as any in the whole continent. But there was one astronomer, who made observations in Russian Poland, in whom he placed the utmost confidence, namely, M. Otto Struve, and whose account agreed closely with his own. Well, M. Struve made most careful measurements of the increase of these prominences on one side, and the decrease on the other, and found that they accorded completely with the rate of the moon's motion across the sun's disc. These measurements and the speaker's own observations indicated that the prominences belonged to the sun. Had they belonged to the moon, they would have gone with her from one side to the other without change.—This was illustrated by a moving model, in which the moon, about eight feet in diameter, was moved across the sun's disc, around which were painted some red prominences.

Owing, however, to the discordances of the observations of the several observers, a new theory was broached to account for these appearances, namely, the diffraction theory, which professed to explain them on the supposition of the interference of light in passing the moon's edge. The Astronomer Royal said, that if there was one point, on which he might permit himself to speak with confidence, it was on the subject of the interference of light, and the production of the diffraction bands, because he had paid particular attention to that subject. It was quite true that light in coming from a source, if made to take two different paths, may be made so to interfere as to produce blackness. Light coming from a great number of points, as when the sun's light is made to pass through a chink in a wall, produces by its interference coloured fringes on the opposite wall or a screen, which have been known since the time of Newton. But if the eye is placed in the position of the screen, then no coloured fringes are seen. And if universally, the diffracting edge is viewed by the eye or through a telescope, so as to bring it well in focus, then no fringes are seen. The moon's edge when observed during an eclipse is brought to a focus, and hence is in the same category as the chink, so that the diffraction hypothesis falls to the ground. The Astronomer Royal dismissed the diffraction theory by stating that he challenged any one to produce experimentally any appearances resembling the red flames by the diffraction of light.

After 1851, there was a total eclipse on Sept. 7, 1858, the central line of which passed across Brazil, and was observed by some of the Brazilian authorities, and also by the French, who, let it be said, never were behindhand when any scientific subject had to be investigated. This eclipse was of short duration, and was not very favourable for observation; nevertheless, it was well observed, and one of the most careful observers had remarked that the luminous prominences disappeared on one side and increased on the other; thus confirming his (the Astronomer Royal's) own observations in 1851. M. Liais had observed that the prominences were not red, but of a leaden hue; this might have been difficult to account for, but that Prof. Pole, who made observations of the Eclipse of 1860, noticed the same phenomenon; but then Prof. Pole was colour-blind, and had, in a paper communicated to the Royal Society, made an especial study of his own peculiar case. Moreover, it was discovered on the occasion of the last eclipse that Mr. Weedon, an engineer on Mr. Vignoles' staff, had also to some extent this peculiar want of power in discriminating colours.

The speaker now took up the subject more particularly of the Eclipse of 1860. He pointed out, on a large projection of the sphere, the course of the eclipse from the western coast of America, near Vancouver's Island, across America, the Atlantic, to the western coast of Spain, thence to Algeria, and on towards the Red Sea, where it was lost in sunset.

Preparations were made by several bodies to observe the great Eclipse; the French Government sent a committee of *savants* to the centre of Spain, and also provided for the observation of the eclipse in Algeria. The Spanish also equipped an expedition, with Señor Aguilar, the Royal Astronomer of Madrid, at their head. The British naval officers on the west coast of America made observations of the eclipse. This country differed from France in having no paid Academicians whom it can call upon to undertake

any scientific investigation; but England possessed, he was proud to say, a large number of highly-educated amateur astronomers, ready and willing to contribute to the advancement of their favourite science. As the official head of Astronomy in England, it occurred to him that he would best promote a complete series of observations of the eclipse if he induced our Government to aid the movement by placing a ready means of transport at his disposal. He therefore made an application to the Lords of the Admiralty, and most handsomely did their Lordships respond to his appeal, by placing at his disposal the finest ship in the British Navy, the Himalaya. And on the 7th of July there sailed from Plymouth an expedition composed of English and foreign astronomers, which, for many years to come, will be remembered as the *Himalaya Expedition*. Not only were the astronomers conveyed to Spain, but they were most liberally provided for on the journey in every respect. One condition he had made in the arrangements entrusted to him—namely, that every person should go out with a definite purpose, and take out adequate instruments to make the observations he undertook. On the whole, this arrangement was fairly carried out; there were some failures which might possibly have been avoided if there had been an opportunity for a previous drill, but that was not possible, but there were great successes. The expedition was much indebted to Mr. Vignoles and the Directors of the railway he was constructing almost in the line of the shadow; most particularly were they indebted to the Chairman, Signor Montesino. The greater part of the expedition landed at Bilbao, but a portion went to Santander, where another railway was also being constructed by English engineers.

The Astronomer Royal, referring to large diagrams he had prepared, commenced by describing the appearances of the corona, and he said he must confess that the various accounts presented great discordances. He particularly pointed out two drawings—namely, that of Mr. Bonomi and that of Lieut. Oom, an officer in the Portuguese Navy, but at present attached to the Imperial Observatory of Pulkowa, in Russia; these two drawings were, he considered, corroborative one of the other, and extremely fair representations of the corona, and both were, moreover, confirmed by the drawings of Mr. Weedon, a talented engineer on Mr. Vignoles' staff. The corona was very bright near the edge of the dark moon, and gradually diminished until its outline vanished in the surrounding darkness; but it was not bounded by a regular outline, for there were several streamers and also curved rays, which were observed and depicted by several observers. Mr. Bonomi observed the planets Venus and Jupiter, close to the obscured sun, shining with great brilliancy. Under no other conditions could these planets be viewed so close to the sun; for in whatever manner the sun might be shut off from view, the atmospheric illumination would drown these planets in light. Mr. Galton's careful drawing presented several strange horns of light, supported in part by Mr. Murray's. Mr. Weiler's presented strange appearances, which it was difficult to reconcile with the others. M. Plantamour, of Geneva, who made his observations near the eastern coast of Spain, made three successive drawings of the corona during the eclipse. The appearances depicted led the speaker to think that they could only be accounted for on the supposition that an atmosphere capable of reflecting light extended nearly from the earth to the moon. It was clear they could not be produced by our atmosphere.

He would show experimentally that there were means of detecting the difference between reflected and non-reflected light; for this purpose he would, with Mr. Ladd's assistance, throw a beam of light on to the screen by means of the voltaic lamp, then as he interposed a doubly-refracting prism the beam would be divided into two beams, one of which would revolve round the other without alteration of intensity as he caused the prism to rotate. He then would interpose an unsilvered glass reflector in the path of the ray, and again place the doubly-refracting prism in the path of the ray. On rotating the prism, the two beams of light not only revolved the one round the other, but each became alternately obscured, thus proving that there is a difference between ordinary light and reflected light; the reflected light being what is termed polarized. By ascertaining, therefore, if the light of the corona were polarized, it could be ascertained with great probability whether it came direct to the eye or whether it had been bent by some reflecting medium. An English observer had proved beyond doubt, that the light of the corona was polarized, and a foreign observer, M. Prazmowski, had even gone further, and had shown that the position of the plane of polarization passed through the sun, the corona, and the eye of the observer. When this was ascertained, it went a long way towards proving that the light of the corona was reflected by something like an atmosphere, or at all events a medium capable of reflecting light intermediate between the earth and the moon. Was there an atmosphere extending from the earth to the moon? The speaker stated that he knew not; but he knew of no other hypothesis which would account for the appearances presented by the corona.

The Astronomer Royal now returned to the red prominences which he stated were seen in great beauty during the Eclipse of 1860. As he had stated in the early part of his lecture, the question had been raised whether they belonged to the sun or to the moon. By means of the moving model, he showed that if they belonged to the moon they would follow her as she moved onward; but if they belonged to the sun those on the left would be shortened and those on the right lengthened as the moon moved from right to left: as they were actually found so to do, it was a strong *primâ facie* argument that they belonged to the sun. M. Faye had also pointed out the following fact. Suppose there was a prominence on the top of the sun at the commencement of the eclipse, it was evident that it must be at that moment to the left of the moon's centre; at the middle of the eclipse it would be just over the centre, and on the right of the centre at the end of the eclipse. It was not at all probable, if the prominence were an illusion resulting from the sun's light shining through the valleys on the moon's limb, that all parts of the edge could produce the same identical figure.

It would be therefore seen that, besides measuring the increase and decrease of luminous prominences in the path of the moon, it was important also to ascertain if any prominence changed its angular position with respect to the moon's centre. The Astronomer Royal stated that in order to do so he had had certain lines ruled on one face of the reflecting prism, which was placed in the focus of his telescope, which was a refractor four inches aperture, mounted on a sort of altazimuth stand of a very portable kind: this was exhibited to the audience. Mr. De La Rue had used somewhat similar means, and being very skilful in making hand-drawings of heavenly bodies, in which he had great practice, he completed two drawings, which were exhibited on the diagrams in connexion with the micrometer lines he had employed; one of these drawings was made towards the commencement, the other towards the end of the totality. Now it was perfectly obvious on looking at these drawings, that the prominence and red cloud situated at the top of the sun, and nearly at right angles to the path of the moon, had shifted their angular position during the period of the eclipse. Dr. Bruhn, of Leipsic, who went to the east of Spain, not being provided with any means of measuring the angular position of a protuberance, profited by the circumstance that one of the prominences became visible before the totality, and remained so for several minutes afterwards, to make measurements of the distance of the protuberance from the cusps. Now the position of the cusps could be calculated to the utmost degree of accuracy for any particular time, and Dr. Bruhn found that if the prominence belonged to the moon, the cusp must have shifted 26° from its first position on the moon's limb; but that if it belonged to the sun, the cusp had not shifted 1° during the time he was observing. This was most conclusive evidence that the prominence belonged to the sun.

The Astronomer Royal then pointed out other drawings of the prominences, particularly a very beautiful one by Mr. Fearnley, of Sweden, which, as far as it went, confirmed Mr. De La Rue's drawings of the prominences. He then went on to say, that in 1851 M. Busch took a daguerreotype of the corona and prominences, but it was not a very successful attempt. Since that period photography had made great progress, and it occurred to Mr. De La Rue and others that it would be extremely desirable to get photographs of the eclipse. Mr. De La Rue took with him the Kew photoheliograph, and obtained two large photographs of the totality. Father Secchi, of the Collegio Romano, had obtained five small photographs, and through the kindness of Señor Aguilar he had obtained photographic copies of them. The photographs of Mr. De La Rue and Father Secchi, though made at widely different localities, agreed very closely. In both, the changes in the angular position of the prominences had been measured, and they agreed entirely with the supposition that they were connected with the sun.

Father Secchi had explained, in striking language, his reason for preferring photographs to eye-observations. And he had shown that certain observations, on which M. Plantamour had founded an idea that the changes of magnitude of the prominences were not explained by the moon's motion, were entirely disproved by the photographs.

Some British officers stationed on the western coast of America observed the totality from Puget Sound, when the sun was only 2° above the horizon; and he had received some excellent drawings from Capt. Richards and Capt. Parsons. On comparing the drawings of the prominences made on the west coast of America with those made in Spain, he was unable to reconcile one with the other,—but there was an interval of two hours between the two observations, and it was quite possible that in that interval of time fresh prominences had come into view; and if the sun was constantly boiling up, and these protuberances were fumes, it could not be wondered at if there was a change during that period. There was no perceptible change, however, during the short interval of time between the observations in Spain.

If the prominences belonged to the sun, the question arose, could we see them at other times than during a total eclipse? With the assistance of Mr. Nasmyth, who had contributed the most important part of the apparatus, he had made many attempts, but had not succeeded. The apparatus had been lent to Mr. Piazzi Smyth when he went to the Peak of Teneriffe, but he failed to see the prominences. These negative results did not in the least detract from the evidence of the prominences belonging to the sun, because we never could get rid of the effect of the highly illumined atmosphere through which we viewed the sun, and which, do what we would, extinguishes even brighter objects than the luminous prominences.

The Astronomer Royal then explained the admirable mode of mounting of the Kew photoheliograph, as arranged by Mr. De La Rue, and having pointed out the peculiarities of the Equatorial mounting as distinguished from the Altazimuth, he strongly advised any person who intended to observe a total eclipse, to take with him an equatorially mounted telescope, fitted with clockwork to drive the telescope, so that the measurements might be made without the observer's attention being disturbed by having to follow the movement of the moon by hand.

He then pointed out that in Mr. De La Rue's photographs, prominences were depicted which could not be distinguished by the eye, as well as those which were visible to the eye. Indeed, the photographic method brought out more than could be observed by the eye, and some care was requisite in comparing the eye observations with the photographic results.

The Astronomer Royal then said that time had run out faster than he had anticipated, but he would nevertheless ask Mr. De La Rue to exhibit his photographs by means of the electric light. Mr. De La Rue complied with the request, but being called upon by the audience to explain the photographs, Dr. Tyndall kindly took charge of the electric lamp, and threw upon the screen

enlarged images of several pictures, including the totality pictures, the beauty of their effect eliciting loud applause. Mr. De La Rue also explained a representation of the corona and the entire series of red prominences, by the Rev. C. Pritchard, as well as one by himself, which were projected by means of the electric lamp.

FOREIGN CORRESPONDENCE.

Florence, Sept. 15, 1861.

FLORENCE is just now in all the heat and hurry of the first Italian Exhibition of Art and Industry, which, by a united effort of zeal and perseverance, rare in any country, opened to-day. The King and his sons were present. I shall send you the details by another post.

Among the attractions which are prepared for the half-million of visitors whom Florence is expecting to welcome to her "At Home" this autumn, I pass over in silence the projected amplifications of the original plan of the Exhibition by the addition of an agricultural and horticultural show,—the popular festivals now in course of preparation,—the opening of the grand old Palazzo di Giustizia (known as the Bargello), after its admirable regeneration at the hands of skilful architects,—and even the improvements at the *Accademia delle Belle Arti*, which on this occasion will display certain treasured works of Art not hitherto exhibited to the public. All description of these dainties must needs stand aside for the moment, to give place to a few words of notice of a projected Exhibition, which it may boldly be said that no other European city save Florence could get up for its expected guests with anything like the same promise of splendour and success, if indeed the plan could be realized at all: I mean an Exposition of Objects of Mediæval Art in every branch. Some time back, when the project for the Italian Exhibition began first to take such consistency as to render its execution a certainty, a zealous lover of the *cinque cento*, and an antiquary of well-deserved repute, Dottor Marco Guastalla, conceived a design of collecting the choicest of the mediæval Art-treasures which the Tuscan cities contain and arranging them for public inspection in the stately halls of the Palazzo di Giustizia—a fine and striking idea; for how could its noble old walls have been more fitly adorned than with the masterpieces of that wonderful time when Italy stood foremost in the race of genius as of culture among the peoples of the world, and poured out with such incredible fertility the fruits of her creative power in every form of embodiment, that even now, after the lapse of near four centuries, and after serving as an exhaustless Art-mine for younger nations to draw upon, the dusty lumber-rooms of her old family mansions,—not to speak of their private galleries,—her musty convent treasuries, and sometimes even her peasant cottages, are rich in the unguessed and unchronicled works of Art of that abounding elder time? Dottor Guastalla's earlier project unfortunately met with difficulties at its outset which rendered its execution impossible; yet nothing daunted nor discouraged, he struck out, like a genuine enthusiast bent upon the accomplishment of his patriotic design, the spirited scheme of temporarily giving up his own house, on the Piazza della Indipendenza, for the purposes of such an Exhibition. The *locale* is singularly well suited to the requirements of this plan, as it consists of a large and handsome suite of rooms on the ground-floor looking into a pleasant garden; and one of the saloons especially is such as few private houses can boast, being an octagonal room of great height and size, originally built for a splendid studio by the late American sculptor Greenough, whose residence it was for several years. Here the whole rich collection of objects of Mediæval Art, now in the possession of Dottor Guastalla, will be opened to the public, together with an immense number of contributions of a similar kind from the storied old palaces of the Florentine nobles and the cabinets of Art-collectors, both here and in the other Italian cities. Long lists of the names of contributors to this Exhibition have appeared in the Florentine daily papers, and among them it is pleasant to see those of two or three of our countrymen, long resident in Italy. The offerings will include specimens of first-rate beauty and value, chosen from every branch of Art. There will be bronzes and marbles moulded by the life-giving hands of Donatello, Gian di Bologna, and Desiderio da Settignano; rich garland-work of fruits and flowers, on a large scale, all alive with lizard, snail and beetle, in the wonderful earthenware-work of Luca della Robbia; a splendid terra-cotta by Orgagna; delicate cinque-cento ivories, and peacock-hued Majoliche of Faënza and Urbino; precious enamels of Byzantine and Longobard workmanship, especially one remarkable and costly relic-casket, enriched with quaint and glowing enamelled figures of saints and angels; Venice glasses, light as the bubbles of the sea-foam, frosted and lace-worked, white and coloured, tricked out fantastically with gilded masks and fabulous monsters; masterpieces of iron and steel work, incrusted with gold and silver, or bossed with figures and tracery in high relief; ancient arms and household furniture; cabinets in ebony and ivory, and *pietra dura* work of high perfection, especially an inlaid altar of great size and beauty; gems and cameos, and a splendid show of Italian coins, medals, and Mediæval seals, which, though the work of a very few years' antiquarian zeal and research, may safely challenge comparison with many a public collection.

Besides these and such like items of price in the Exhibition, it will comprise the magnificent Archinto tapestries, which were for centuries the pride of the noble and ancient Milanese family of that name until a short time back, when, at the death of the Count Giuseppe Archinto, the title became extinct, the once colossal property of the family was broken up and scattered piecemeal among a host of creditors, and the untold wealth of objects of Art which had adorned the ancestral Milanese palace—for the Archinti were great collectors and patrons of the arts—fell into the hands of the highest bidder. The enterprising gentleman who bought these world-famous *Arazzi* for the comparatively trifling sum of a hundred thousand francs, has already, it is said, been offered a hundred and fifty thousand for them. The *Arazzi* are twenty-four in number, and vary greatly in size and proportions. The largest of the series being about nine by nearly five mètres in dimension. So exquisite is the fineness of the work, and so skilful the blending of the colours that they may truly be said to be unrivalled among the productions of the loom, even by the Gobelin tapestries. Sixteen of the designs are from the pencil of Giulio Romano. Eight represent the principal events in the life of Scipio Africanus, and eight more, the battles and triumphs of the Emperors Vespasian and Titus. The remaining eight are from designs by David Teniers the younger, and portray scenes of country life, village feasts, rural dances and a whole round of rustic junketings, drawn with infinite *naïveté* and burlesque humour, while the landscapes are full of beauty and truth of design. They are all framed as it were in broad borders of the most vivid richness representing flowers, fruits, cupids and scroll-work in graceful combination. The *Arazzi* were executed in Flanders at an immense cost in the first half of the seventeenth century, by commission from Count Horace Archinto, a man of varied knowledge and refined taste, who profusely added to the stores of precious works of Art already brought together in the venerable halls of the Archinto palace. These magnificent tapestries have hitherto been but little seen, although mention has been made of them in more than one Guide-book, and some space was devoted to a description of their beauties in the great and elaborate work, called '*Milano e il suo Territorio*,' published at Milan in 1844, on occasion of the Scientific Congress, which was held there in that year. Under what different auspices and with what altered surroundings they will be now again exhibited to the world in 1861, amid the festival time of a free people, and in the *artistic* capital (whatever be ultimately the seat of government) of the new Italian kingdom!

A considerable portion of the proceeds of Dottor Guastalla's Mediæval Art Exhibition is to be devoted to the assistance of the Orphan Asylum, the name of one of whose most efficient patronesses, the Princess Strozzi, figures on the list of promoters of the good work. The receipts thus obtained for this excellent charity are expected to be very large, for the Exhibition, in itself highly attractive to all who find a charm in the marvels of ancient Art, will be rendered yet more so to the crowds of mere loungers and pleasure-seekers, who may be reasonably expected to form part of the visitors to Florence, by the evening illumination of the whole suite of rooms, which will thus form a tempting promenade for the resort of the gay company in these beautiful star-lit September nights, when wide open glass-doors, airy terraces and fresh garden scents are so pleasant an addition to the course of sight-seeing, which they will consider *de rigueur*.

All the new stir and movement of this pleasant time is, as may be believed, a dose of wormwood to our select party of *Codini*. After trying hard to persuade the Italian public, in the columns of the *Armonia* and the *Contemporaneo*, that there will be nothing to see at the "so-called" Exhibition, except two or three rusty machines, a few pieces of rickety furniture, and an indifferent cattle-show; as they find their warnings disregarded, they have changed their plan of attack, and now enliven their newspaper paragraphs with "shocking accidents" at the palace of the Exhibition, "reckless sacrifice of life" among the artizans employed there, caused by the shameful demands made on their powers of working against time by the Government inspectors; continual and lamentable accounts of the robberies committed there by day, and the attempts at incendiarism by night, and a whole host of other schemes of annoyance, as malicious as they are futile to excite a hostile feeling in the popular mind against the undertaking, which will help Italy on yet another important step in her path of progress. A few of these active partizans of Divine Right showed the cloven foot, it seems, the other day in the very last place where one would have expected to find them, namely, in the servants' offices of the Palazzo Pitti.

TH. T.

OUR WEEKLY GOSSIP.

ON and after October the 5th the price of the *Athenæum* will be THREEPENCE.

Thirty years ago, when the *Athenæum* came into the hands of its present Proprietors, its price was Eightpence, and its contents, with advertisements, forty-eight columns. Convinced that the circulation of Literary Journals was restricted by high price, and that every advantage offered to the public would bring increase of circulation and authority, the Proprietors reduced the price one-half—to Fourpence. The experiment succeeded, and cheap Literary Journals became the rule.

The Proprietors have always held to the principle then proved. They have given to the public the benefit of every change in the law, increasing their size without increase of price, until the average has become about sixty columns of literary matter, with forty columns of advertisements, selected so as to be of general interest.

The Proprietors, taking advantage of the abolition of the Paper Duty, have now resolved that on and after the 5th of October the price of the *Athenæum* shall be reduced to THREEPENCE.

We understand that M. Mazzini is engaged in writing Memoirs of his Life and Times—a work which will embrace a good deal of the secret history of European events during the last thirty years.

We are also informed that Signor Daelli, of Milan, is collecting the political and literary works of Signor Mazzini, which he proposes to publish in about twelve volumes. A translation into English of his 'Duties of Man' is nearly ready for the press.

It is understood that Her Majesty's Commissioners for the Exhibition of 1862 have accepted

tenders for the two Catalogues, Industrial and Fine Art. The three lowest tenders were those of Messrs. Truscott, Son & Simmonds, Messrs. Harrison & Co., and Messrs. Clowes & Sons. The tender of Messrs. Truscott, Son & Simmonds, being the lowest, has been accepted.

Prof. Huxley desires us to print the following communication :—

"The Government School of Mines, Jermyn Street, Sept. 17, 1861.

"The publication in the *Athenæum* for last week of the statements made to the audience assembled in Section D. of the British Association respecting the structural relations of the human and simious brain, constrains me to request that you will be so good as to give equal publicity to the following letter, addressed to my friend the Professor of Physiology in the University of Oxford, and read by him at a subsequent meeting of the same Section: —'My dear Rolleston,—I have just received the accompanying revise of my forthcoming paper 'On the Brain of Ateles.' Will you be so kind as to have the leading points in it communicated to Section D? The obstinate reiteration of erroneous assertions can only be nullified by as persistent an appeal to facts; and I greatly regret that my engagements do not permit me to be present at the British Association in order to assist personally at what, I believe, will be the seventh public demonstration during the past twelve months of the untruth of the three assertions, that the posterior lobe of the cerebrum, the posterior cornu of the lateral ventricle, and the hippocampus minor, are peculiar to man and do not exist in the apes. I shall be obliged if you will read this letter to the Section, and I am, yours faithfully,

THOS. H. HUXLEY.'

The paper referred to is now in course of publication in the 'Proceedings of the Zoological Society.'

"T. H. HUXLEY."

The various Colonial Governments have subscribed very liberally towards the expense of a proper representation of their peculiar products at the forthcoming International Exhibition of 1862. It is indeed desirable that a better and more creditable show should be made by them than was the case in 1851, in London, or even at Paris, in 1855, great advance as the latter indicated in appreciation of these monster gatherings. Amongst the sums subscribed are 8,000*l.* by the Canadian Government, 5,000*l.* from that of the Cape; British Columbia contributes 2,000*l.* (a large sum for such a young colony); 2,000*l.* will be devoted by Queensland; Tasmania, 2,000*l.*; New South Wales, 3,000*l.* —together with 5,000*l.* for an exhibition of gold—which is, we understand, not to be a simple collection of huge nuggets, but a scientifically-arranged gathering of specimens of gold ore in its native states and amongst its native attachments of quartz, &c. Gold purifying machines and all sorts of implements employed at the diggings are to be exhibited. The weight of nuggets will be limited to six ounces. A further sum of 5,000*l.* is devoted by Victoria towards this gold display, together with 5,000*l.* more for general purposes. New Brunswick appropriates 1,600*l.*; British Guiana, 1,000*l.*; from other colonies will come like sums. Large collections of lacquered ware are coming from Japan and China, together with examples of all the beautiful textile fabrics produced by those countries, with specimens of their agricultural and scientific instruments and raw products. A great collection of the productions of our Indian Empire is being made by Dr. Forbes Watson, which promises to be the most complete ever got together. India will have a separate court, as in 1851, and not rank with the Colonies, to which last 12,000 superficial feet of space is appropriated at present, and more will probably be required. There is not more than a fourth larger amount of space disposable than there was in 1851. Yet ten times as much is required. England alone, it is said, demands twice as much as the whole contents of the building, and France complains of having appropriated to her about one-tenth of her requirements. The 30th inst. is fixed as the last day for receiving applications for space, and after the 12th of February next, exhibitors may commence sending in their contributions, and continue doing so until the end of March, after which date nothing will be received under any circumstances whatever.

The Queen has chosen a design for a lace flounce, by a student of the Female School of Art, to be exhibited at the International Exhibition of 1862; an act of graceful and thoughtful patronage worth a world of fine words.

John Francis, sculptor, whose death, at the age of eighty-one, is announced, was one of those artists who enjoy a good practice among their immediate patrons without being known to the general public. In a brief memoir which has been sent to us it is said that he was a pupil of Chantrey, but this, we think, must be a mistake, for Francis was grown a man when Chantrey was a mere child. Mr. Coke, of Holkham, subsequently Earl of Leicester, was the first patron of Mr. Francis, whom he introduced to his Whig friends as a bust-maker of promise. The portrait busts executed by him would fill a gallery, and form a compendious set of illustrations to a history of the Whigs in our time. His works also include a series of busts of the royal family. Mrs. Thorneycroft, his daughter, inherits his connexion, and continues the practice of his art.

Our Lubeck Correspondent, in sketching the biographies of the artists and men of letters of that city, alluded to the interruption of Prof. Deeckes' historical studies by the Revolution of 1848, and in consequence of his having been elected as representative of a Republic during a period of democratic agitation. Inadvertently, and without intention to discount the rest of his eulogy, our Correspondent described him as a democrat. But it appears that this epithet has a signification in Germany of which we have no idea in England: it is suggestive, we are told, of nothing but physical-force anarchists. We wish, therefore, to cancel a word capable of such misconstruction.

Our readers will grieve to hear that the Australian Expedition has met with a fatal stop. Mr. Burke, accompanied by Messrs. King, Gray and Mills, with a horse and six camels, had left Cooper's Creek for the Gulf of Carpentaria, and nothing had been heard of him or his party. It is feared they may all have perished. The summer had been unusually dry in Australia, as elsewhere; the watercourses were dried up, and scurvy carried off many of those who remained behind at Cooper's Creek or at the Darling. Among those who are known to have died is Mr. Ludwig Becker, the naturalist. Mr. Brahe, who led the remnant of his broken party back from Cooper's Creek, says:—"When Mr. Burke left he said he should be back in three months' time at most. He expected to be able to reach the Gulf of Carpentaria, and return in less than three months. He did not say he expected to meet a ship at the Gulf of Carpentaria. Mr. Burke was quite positive about coming back to Cooper's Creek. He said he would run no risk whatever. He said he would make a push for the Gulf from Eyre's Creek. He said he might be back in a month." But, four months passed, and he had not returned. The natives had become extremely hostile to the white men. Mr. Brahe's opinion with respect to Burke was, that he had gone to Eyre's Creek, and thence towards the Gulf; that he had gone on expecting to find water, but had found the holes dry; that in this way he had gone too far, thinking to find water ahead, and was unable to return from want of water. He believed that Burke and his party were stuck fast. He was also afraid that the party were attacked with scurvy; but there were no symptoms of it when they left. Burke seemed to be in good health when he left. The Exploration Committee took steps at once to afford relief. Mr. Howitt had been despatched with a party to Cooper's Creek, but becoming acquainted with the state of matters he had returned, and his party was re-equipped and strengthened. Another party, under the command of Major Walker, was to start from Rockhampton for the Albert River; and a sea party has been organized, the Chief Secretary having consented to place a sum of 2,000*l.* on the estimates for that purpose. We hope the survivors may be reached in time.

It is a hard thing to find old remains one after another being swept away; but a few months ago it was the splendid gateway of Reading Abbey, now, the old walls of Rochester, that have withstood time and accident so many centuries, are being blown up by gunpowder, under the guidance of the Sappers and Miners. It is for educational purposes, so to speak, that this is being done, additional ground being needed for the enlargement of Sir Joseph Williamson's Free Mathematical School at Rochester.

A Correspondent, writing from Malton, Yorkshire, respecting the negligent compilation of Messrs. Black's 'Guide-Books for Tourists,' especially in reference to the old Priory Church at Bridlington in the above county, omitted to state that the building has been recently restored by Mr. G. G. Scott in a thorough-going fashion and with tolerable success. A new open-timbered roof has been placed above a portion of the nave, the remaining portion is old, and well worthy of notice for its excellent design, and the figures remaining on the ends of the hammer-beams, amongst which are to be seen the effigies of St. George or St. Michael the Archangel, it is difficult to say which, so lofty is the roof, and several angels. The same writer refers to the curious "church-collar," but does not explain that that instrument is a jointed ring of iron which was put round the necks of turbulent boys at church; by this they were chained to the wall. The offertory-box is without a lid, but the hinge remains set in the stone. The four books chained to the desk are controversial in character, Hooker's 'Ecclesiastical Polity' being the best reputed of them; they are of a date contemporaneous with the above. The Early English buttresses on the north side are worthy of admiration for their beautiful proportions and design; they are boldly chamfered at the angles, and carved at the bases of the splay. Over the porch has been a priest's chamber or muniment room.

SCIENCE

BRITISH ASSOCIATION.

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

SATURDAY.

'Provisional Report on the Magnetic Survey of Great Britain,' by Gen. SABINE.—The Report was nearly completed, but three stations remained yet unfinished; Gen. Sabine, therefore, preferred deferring the presentation of the Report to the next Meeting, when he hoped to have it complete and ready for presentation to the Physical Section.

'On the Amount of Direct Magnetic Effect of the Sun or Moon upon Instruments at the Earth's Surface,' by G. J. STONEY.

'On the Laws of the principal Diurnal Irregularities, Solar and Lunar, of Terrestrial Magnetic Forces as deduced from Ten Years' Observations at Greenwich, and on their Apparent Causes,' by the ASTRONOMER ROYAL.—The author described in an admirable manner, and suited to the comprehension of all present, what was meant by deviation and diurnal inequalities. Taking, he said, a compass needle or other bar of magnetized iron, if this were freely suspended it would take up a definite position as affected by the earth's attraction. Two forces pulled the needle, one towards the north, the other towards the south. Its position, however, did not remain constant during the day, nor yet during the year; and it was of the utmost importance to register the deviations it made, either by the eye of an observer, or by the far more accurate method of self-registration. The latter method was employed at Greenwich, and was effected by causing a cylinder of sensitive paper to revolve once during the twenty-four hours; on this the beam of light reflected from the needle fell, and made a curved line on the sensitive paper. In a similar manner the amount of force pulling the needle north or south was registered; and thus the horizontal force acting on the needle endways and that acting sideways were rendered visible, and their changes, from time to time, calculated. The common daily disturbing force varied in different years extremely, from 1848 to 1857; and

monthly also, for in June and July it was greatest, and in December and January least. This last observation led him to consider that it might depend a good deal on the radiation of the sun's heat, which was greater in summer, of course, than in winter. An interesting diagram was exhibited showing the law of this disturbing force, and consequent deviation of the needle during the day. It was greatest at noon, and decreased from that time till eleven at night, when it was least. The disturbance at the time when greatest tended in a south-westerly direction. He was inclined to explain the fact of this direction being taken from the consideration that Greenwich was peculiarly situated with regard to the distribution of land and water on the face of the globe. During the early hours of the afternoon, the sun, when on the north of the equator, was vertical over a great space of water lying in a south-westerly direction from Greenwich, the radiation from which was very great. Magnetism and galvanism were in his view interchangeable terms; and it was well known that it was difficult to get a galvanic current through the earth at any place on its surface when there was little or no moisture; and thus the sun shining before it reached the meridian of Greenwich on the arid plains of Central Asia, would have less magnetic effect than a few hours later in our day.

Gen. SABINE, in making some observations on the remarks of the Astronomer Royal, said that he (the Astronomer Royal) had, in an unusual degree, the happy art of popularizing a scientific and technical subject. It required some courage to offer an explanation of the strange movements of the magnet, and those who studied the subject of magnetism with attention knew that the science was in this state, that they had a great many observations reduced and generalized, and that what was now wanted was a good suggestion to explain them; and the Astronomer Royal deserved thanks for the one he had thrown out. There was this great objection, however, to the explanation, that the deviations were produced by merely local causes, that we find exactly the same deviations, with small exceptions, at magnetic stations in North America and Tasmania; and even within the arctic circle, where for three months the sun never appears above the horizon, and where, therefore, no radiation could exist. — The ASTRONOMER ROYAL, in replying, said that, though it required some courage to make a supposition, it required still more to abandon it, which he was ready to do, if required by facts. He then proceeded to notice those magnetic deviations apparently caused by the moon. His opinion was, that these followed the law of the double tides, having the same epochs. There was a double tide of magnetism every lunar day, following the hours like the tides. There was, however, a considerable discordance in the results obtained for the several years of observation, though this did not destroy their value. No action of the moon as an independent magnet could produce this, and probably the influence was a reflected one from the magnetic earth. He also suggested that it was probable that the moon produced a double tide in the air, and if so in the oxygenic part of it, and they were therefore justified, from the recent discoveries of Mr. Faraday, in expecting a magnetic disturbance twice a day.

'On Spontaneous Terrestrial Galvanic Currents,' by the PRESIDENT.—The Astronomer Royal, after pointing out how seriously these spontaneous galvanic currents interfered with the working of telegraphs, stated, that he had been in correspondence with Mr. Lamont, of Munich, on the subject, and that, although his replies were of the nature of private communications, yet he considered them so valuable that he had determined to lay them before the Section, and he was sure, if he had the opportunity of asking for Mr. Lamont's sanction for so doing, he should readily obtain it.

'On a Probable Cause for the Observed Diurnal Variation of Dip and Declination,' by Prof. HENNESSY.

'On the Quantity of the Acceleration of the Moon's Mean Motion as indicated by the Records of certain Ancient Eclipses,' by the Rev. EDWARD HINCKS.

General SABINE stated, that the Astronomer Royal had requested him to state that he had been obliged to leave the Section to keep an appointment; but as, of course, the communication just read would be published *in extenso*, he would have an opportunity of considering it at leisure, and replying, if necessary.

'On the Secular Changes of Terrestrial Magnetism and their Connexion with Disturbances,' by the Rev. H. LLOYD.—It has been generally supposed that, at a given place, the mean yearly values of the magnetic elements were subject to no fluctuations of a minor period; and consequently that, for a limited number of years, the rate of the change of these values from year to year was either uniform, or else uniformly accelerated or retarded. This idea, so far as relates to the magnetic inclination, has been completely disproved by Prof. Hansteen. From the long and accurate series of observations of this element, made by himself at Christiania, Prof. Hansteen has inferred that the mean yearly value of the inclination is subject to a *periodical fluctuation*, as well as to a progressive change. The length of this period, according to Prof. Hansteen, is 11½ years; the maxima occurring in the years 1828, 1840 and 1851, and the minima in 1823, 1834, 1845 and 1856. The Dublin observations, so far as they extend, exhibit similar results. If we assume that the inclination decreases from year to year proportionally to the time, and compare the results calculated according to this hypothesis with those actually observed, the differences clearly exhibit a cycle or period, whose duration does not differ materially from that laid down by Prof. Hansteen. The amount of the periodical part of the variation in 1845—the year of minimum—is so considerable as to mark altogether the regular yearly decrease. The Dublin observations exhibit a similar law in the values of the horizontal component of the earth's magnetic force, as deduced by means of the bifilar magnetometer, combined with absolute determinations made according to Gauss's method. When these results are corrected for the secular change, supposed uniform, they show very clearly the existence of a cycle. The maximum is 3·5071, and occurs in the year 1844; the minimum is 3·5027, and is the mean value of the horizontal intensity for the year 1848. Dr. Lloyd concluded by pointing out the connexion of these phenomena with the periods of greater or less prevalence of magnetic *disturbances*, and showed in what manner the disturbances operated in producing these effects. The general action of a disturbance is to augment the inclination and to diminish the horizontal force; and, accordingly, the year of greatest disturbance should be also that of greatest inclination, and of least horizontal intensity—these elements being supposed to be corrected for the regular progressive change. In the same manner as the easterly disturbances of the magnetic declinations preponderate over the western in this part of the globe, the effect of disturbances should be, on the whole, to diminish the mean westerly declination, which should therefore exhibit a period of the same duration.

General SABINE remarked on the value of this communication as the condensed result of years of laborious research. In his opinion a request should be sent up from the Committee of the Section to the Committee of Recommendations that it should be printed *in extenso* in the next volume of the *Proceedings* of the Association, as justice could not be at all done to it by the abstract laid before the Section.

'On the Effect produced on the Deviations of the Compass by the Length and Arrangement of the Compass Needles,' by A. SMITH and F. J. EVANS.

'On the Involution of Axes of Rotation,' by Prof. SYLVESTER.—After a brief statement as to the most general mode of representing the displacement of a rigid body in space by means of angular rotations about six distinct axes fixed in position, it was shown that under peculiar conditions the six axes would become insufficient, being, in fact, equivalent to a smaller number, in which case they would be said to form a system in involution. Various constructions for representing such and similar systems were stated, and the remarkable conclusion presented, that the necessary and sufficient condition for three, four, five, or six lines being thus mutually, as it were, implicated and involved consists in their lying in ruled surfaces of the first, second, third, and fourth orders respectively. The theory of involution originated with Prof. Mobuis, by whom, however, it had been left in an imperfect condition. The author referred for further information on the subject to some recent notes by himself in the 'Comptes Rendus' of the Academy of Sciences of Paris, and to certain masterly geometrical investigations of M. Chasles and Mr. Cayley, to which these had given rise.

'On Curves of the Third Order,' by A. CAYLEY.

'On Definite Integrals,' by BIERENS DE HAUN.—M. De Haun has published several volumes of tabulated integrals.

SECTION D.—ZOOLOGY AND BOTANY.

SATURDAY.

'On the Method of Mr. Darwin, in his Treatise on the Origin of Species,' by H. FAWCETT.

'On a Scheme to induce the Mercantile Marine to aid in the Advancement of Science by the intelligent Collection of Objects of Natural History,' by Dr. COLLINGWOOD.—The author pointed out the advantage which sailors possessed for the collecting of objects of natural history, and at the same time drew attention to the little that is really done by our mercantile marine for increasing our store of objects of natural history.

Mr. THOMSON, of Hull, suggested that a committee should be formed, and that systematic efforts should be made to draw the attention of the proprietors of vessels to the subject.—Dr. LANKESTER believed that nothing short of educating sailors in the elements of Natural History would induce them to collect intelligently such objects as the naturalist most desired. He suggested that the rewards offered by the Committee of Council on Education, by the Science Minute of June 1859, would induce some persons to undertake classes of Zoology in our seaport towns. Already several navigation schools had been established, and he believed if the purport of the Minute were more fully known, it might be made available for obtaining the objects Dr. Collingwood had in view.—The Rev. Mr. HIGGINS, of Liverpool, gave an account of the difficulty there was in inducing sailors to collect.—Mr. J. A. TURNER thought little could be done by men on board our ships, but that the surgeons and officers might be induced to collect. He had obtained in this way a large collection of rare objects in natural history.—Mr. PATTERSON thought that sailors should be taught Natural History. They would then be able to appreciate the difference between valuable and valueless species. He believed that such a pursuit would do much to relieve the tedium of the leisure hours which so often pressed heavily on the sailor.—Dr. WRIGHT alluded to the fact that we possessed no good collection of fish in this country, and that sailors might be induced to catch fish and preserve them, till they came home and could dispose of them.

'On the Flora of Manchester,' by L. H. GRINDON.—After some observations on the climate and soil of Manchester, the author remarked:—"The positive character of the Manchester Flora consists in the presence of 370 or 380 British plants, which are indifferent to the soil they grow upon, and which clay and sandstone suit as well as any other. These are, of course, the common plants of the country in general; and were it not that the peat-bogs furnish many species peculiar to such habitats, and that the low level of the country and the abundance of moisture combine to the production of innumerable marshy hollows, in which plants are found plentifully that the limestone districts afford penuriously or not at all—were it not for these, the Manchester Flora would be no more than a list of cosmopolites. The ponds of the district, locally called 'pits,' are innumerable. In Cheshire they often become enlarged into beautiful sheets of water, called 'meres,' which greatly enhance the picturesque character of the northern parts of that county. South-east Lancashire contributes also a peculiar class of habitats in its innumerable and very pretty little winding

ravines, locally called 'cloughs,' the sides clothed with trees, and a stream running along the bottom. These, like the marshy hollows, supply many plants in great abundance that districts more favoured in soil and climate fail to offer, and, along with the peat-mosses, supply the principal part of what is locally interesting. Of rare and extraordinary plants we do not possess a single instance, except when they appear, as in other places, adventitiously. We have no permanent treasures or rarities, such as give celebrity to St. Vincent's Rocks, the Great Ormshead, and the Scotch mountains. If a claim to such a character can be asserted by any of our plants, that claim must come from *Carex elongata*." In conclusion, he noticed some of the more remarkable and conspicuous plants of the district. He added that, on a review of the whole subject, it appears that the Manchester district, although exposed to some great disadvantages, is quite as productive of interesting plants as any other. They are fewer in number, and they are less brilliant in appearance; nevertheless, the botanist who would wish to enjoy himself, and to find everything necessary to intimate acquaintance with the types of the British Flora, need not to distress himself at the seeming dearth of Manchester. If he will seek he will find, his reward augmenting in the ratio of his philosophy.

Dr. GIBB read a paper 'On the Arrest of Puparial Metamorphosis of the *Vanessa Antiopa*, the well-known Camberwell Beauty.'

Dr. CLELAND read a paper 'On the Anatomy of *Orthragoriscus Mola*, the short Sunfish.'

A paper was read from Mr. A. STANSFIELD 'On new British Species of Blechnum.'—Prof. BABINGTON said, that in the absence of specimens, it was impossible to say how far the author was right in his conclusions.

SECTION E.—GEOGRAPHY AND ETHNOLOGY.

SATURDAY.

'On the Osteology and Dentition of the Natives of the Andaman Islands,' by Prof. OWEN.—Prof. Owen commenced by a brief notice of the geography of the Andaman Islands, and condensed an account of the physical characters and habits of the natives, from the Reports of the able superintendents and surveyors of the convict settlements, recently established by the East Indian Government on these Islands: quoting more particularly from the statement of a Brahmin Sepoy, one of the transported mutineers, who, after escaping from the convict establishment, passed upwards of a year (from April 23, 1858, to May 17, 1859,) with a tribe of Andamaners.' His statement accorded with previous accounts, that the diminutive black aborigines of these islands have no notions of a Deity, of spiritual beings, or a future state; that both sexes go naked without any sense of shame. There is promiscuous intercourse, save with the parent, which only ceases in regard to the woman when she is allotted as wife to a man, but is retained as the prerogative of the male sex. "It is impossible," writes Dr. Mouatt, Inspector-General of Jails, Calcutta, "to imagine any human beings to be lower in the scale of civilization than are the Andaman savages. Entirely destitute of clothing, utterly ignorant of agriculture, living in the most primitive and rudest form of habitations, their only care seems to be the supply of their daily food."† The chief weapons of the Andamaners are bows and arrows; some of the males also carry a kind of spear. Scarification of the skin in certain maladies, tatooing, and shaving of the scalp, are performed with chips of glass skilfully detached from bottles cast ashore after wrecks, by sharp blows with a stone. The iron with which the arrows and spears are headed is also obtained from wrecks. The Andamaners appear to be devoid of fear: they are powerful for their size, can carry greater burthens than the Hindoos; are swift runners, and clear rapidly, by jumping, the fallen trees of the jungle and rocks of the tidal shore. As climbers they are little inferior to monkeys, being used from childhood to climb the lofty, straight, unbranched trees of the forest in quest of fruit and honey. They are excellent swimmers from their childhood, and wonderful divers, "fishing for shell-fish in deep water." "I have seen," deposes the Sepoy, "three or four of them dive into deep water and bring up in their arms a fish six or seven feet in length, which they had seized."—"They could perceive canoes approaching long before they were visible to me, and could see fruits and honeycombs in the jungle which I could not. Their vision penetrates to great depths in the sea, where they could see and shoot fish with arrows, when the object aimed at was not apparent to me. They see well at night, catching fish in the pools left by the tide at that season; and shooting the wild pigs which came to the coast to drink by night." By their acute sense of smell they often detect afar off the existence of fruit in the neighbouring lofty trees. "I never met with any one affected with gonorrhœa, syphilis, itch, piles, small-pox, or goitre: but I have seen them affected with vomiting, colic, diarrhœa, intermittent fever, head-ache, ear-ache, tooth-ache, abscesses, rheumatism, catarrh, cough, painful and difficult respiration. The only remedies I have seen used are 'red earth rubbed up with turtle oil,' a cold infusion of certain aromatic leaves, the wetted leaves being applied to the head or other inflamed parts, and local bleedings by sharp splinters of bottle glass." They spin ropes; make wicker baskets, large nets for catching turtle—smaller nets for catching fishes; and they scoop out their canoes by means of a small kind of adze, tipped with a semicircular blade of iron. Thus, for all their immediate wants, invention has supplied the instruments called for by the nature of the surrounding objects and sources of food. But their life is little beyond that of the brute animal; and the low grade of humanity with the dwarfish stature and black colour of the Andamaners have always made a further knowledge of their physical characters peculiarly desirable.—Prof. Owen was enabled to contribute the present notice of the osteological and dental characters, by the opportunities kindly afforded him by Dr. Fred. J. Mouatt, Inspector of Indian Jails, who had brought over the bones of an adult male native of the Andamans, now presented by Dr. Mouatt to the British Museum. The bones presented a compact sound texture, with the processes, articular surfaces, and places of muscular attachments neatly defined. The cranium is well formed, not exceeding disproportionately in any diameter, it might be classed with those of the oval type. The frontal region is rather narrow, but not low; it passes by a regular curve upward and backward to the vertex. The frontal, much of the sagittal, and the upper part of the coronal sutures were obliterated. Part of the lambdoidal suture was very complex. The alisphenoid joined the parietal on both sides of the head. The glabella is but little prominent; the nasals are not flat, but are moderately developed. The alveolar parts of the upper and lower jaws slightly project. The chin is a little produced, and is not deep. The malar bones are not unusually prominent. The cranial bones are not above the average thickness. The following were the principal dimensions of this cranium:—

	In.	Lin.
Length, from inion to premaxillary border (178·0)	7	0
Do. from do. to glabella (160·0)	6	4
Breadth of the cranium (144·0)	5	4
Circumference of the cranium (409·0)	19	6
Ante-posterior diameter of the interior of the cranium (150·0)	5	9
Transverse diameter of ditto (145·0)	5	7
Vertical diameter of ditto (115·0)	4	6

—The spine of the occiput is not so developed as to interrupt the convex contour of the occipital part of the skull; the lower occipital crest is rather more developed than the upper one. The mastoids are moderately developed; there is no super-mastoid ridge. The base of the skull offers all the strictly human characteristics. There is no excess in the size of the orbits or of the auditory apertures; a sharp ridge projects from the lower boundary of the anterior nares. The lower jaw shows a variety in the shape of the coronoid process, which is occasionally seen in Europeans; it is broader and lower than usual; the front border is more convex at its upper half, and forms, with the concave lower part, a deeper and more decided sigmoid curve. The ascending ramus forms a less open angle with the horizontal ramus than in most Negro and Australian skulls. The teeth equal in size the average of those of Indo-Europeans; they correspond in this respect with those of the European figured in the author's 'Odontography,' plates 118 and 119. Although they are large in proportion to the size of the jaws, they are markedly smaller than are those of the Australian figured in the same plates. In the upper jaw of the male Andamaner, the true molars, as in most Europeans, diminish in size from the first to the third. The fissure which penetrates the grinding surface from the outer side, to the middle of the crown, had its end unobliterated in m 1, and retained its whole length in m 2. The enamel was worn from the inner half in both teeth, but in a less proportion in m 2; it was also slightly worn from the outer tubercles in m 1. The degree of abrasion of the teeth, according to the age of the individual, is such as might be expected from the mastication of a diet consisting chiefly of fish and fruit. In the lower jaw the denture is exposed on the three outer tubercles of m 1; the crucial figure is not obliterated in m 2; m 3 is larger, as usual, than in the corresponding tooth above. The upper premolars are implanted by a fang which is divided at its base into an outer and an inner root. The undivided fang of the lower premolars is longitudinally grooved on the outer side. In the upper jaw m 1 and m 2 are implanted by two outer and one inner roots; m 3 by one antero-external and one postero-internal root. All the lower molars have distinct anterior and posterior roots. There was no irregularity in the position, nor any sign of decay in the teeth. All the bones of the trunk and limbs presented the specific and generic characters of *Homo sapiens*, Linn. The sigmoid flexure of the clavicle was well marked. The scapula agrees with that variety of form which shows a minor extent of the supra-spinal tract, and a greater breadth of the lower part of the sub-spinal tract, with a more produced angle between the surfaces for the teres major and teres minor muscles, on the inferior costa. The inferior costa describes a continuous concave curve from the angle to the base of the coracoid, without any supra-scapular notch. The os innominatum, calcaneum, astragalus, and bones of the hallux, contrasted as strongly with the quadrumanous characters of those bones as in the highest of the human races. The first lumbar vertebra had the diapophysis, metapophysis, and anapophysis distinct, and almost equally developed, and well illustrated the true serial homology of the longer diapophysis of the succeeding lumbars. In many European skeletons the diapophysis of the first lumbar vertebra are more developed than in that of the Andamaner. The ridges, processes, and surfaces for muscular attachment are well and neatly defined on the several limb-bones of this skeleton; and agree with the character for agility in running, climbing, and swimming, assigned to the Andaman race. The following were the dimensions of the principal limb-bones:—

Scapula.

	In.	Lin.
Length from end of acromion to inferior angle	7	1
Breadth from upper and outer angle to lower border of glenoid cavity	4	0

Os Innominatum.

Length	7	7
Breadth of ilium	5	5

	Humerus		*Ulna*		*Radius*		*Femur*		*Tibia*		*Clavicle*	
	In.	Li.	In.	Li.	In.	Li.	In.	Li.	In.	Li.	In.	Li.
Length	12	2	10	8	9	11	17	5	14	3	5	2
Transverse diameter of upper end	1	10	1	2	0	10	3	4				
Ditto of middle	0	9	0	6	0	6½	0	11	1	1		
Ditto of lower end	2	1½	0	9	1	3	2	9	1	10		

The above dimensions of parts of the skeleton indicate that they are from an individual of 4 feet 10 inches in height. The Andamaners, or Mincopie, are called by most of the observers who have described them "Negrillos," or dwarf Negroes. They have no knowledge, and appear to have no idea, of their own origin. It has been surmised that they may be descendants of African Negroes,

† Selections from the Records of the Government of India, No. XXV., 'Andaman Islands,' Preface, p. vi.

imported by the Portuguese for slave labour in their settlement at Pegu, and which had been wrecked on the Andamans. But the recorders of this hypothesis allude to it as a mere hearsay, "We are told that when the Portuguese," &c. (*Calcutta Monthly Register, or India Repository*, November, 1790, pp. 15–17). Neither the skull nor the teeth of the male Andamaner above described, offer any of the characters held to be distinctive of the African Negroes. The cranium has not the relative narrowness ascribed to that of the Negro; it presents nothing suggestive of lateral compression; it conforms to the full oval type, with a slight degree of prognathism, and is altogether on a smaller scale than in the Indo-European exhibiting that form of skull. It is to be presumed that the Portuguese would import from the Guinea coast, or other mart of Negro-slaves, individuals of the usual stature, and it is incredible that their descendants, enjoying freedom in a tropical locality affording such a sufficiency and even abundance of food as the Andamans are testified to supply, should have degenerated in stature, in the course of two or three centuries, to the characteristic dwarfishness of the otherwise well-made, well-nourished, strong and active natives of the Andaman Islands. Prof. Owen concludes, therefore, that they were aborigines; and merely resembled Negroes in a blackness of the tegumentary pigment, which might be due to constant exposure in such a rude and primitive race. Their prognathism is not more than is found in most of the Southern Asiatic peoples, and indeed in the lower orders of these in all countries, and may be due or relate to the prolonged sucking of the plastic infant. The observation of the hair of the scalp, which we must suppose to be unsatisfactory or insufficient in regard to a race that habitually shaves or eradicates the hair, were it exact in regard to the crisp, curly, or woolly character of the hair, would show a resemblance of the Andamaners to the Papuans and Australians, as well as to the African Negroes. But the skull and dentition of the Andaman male is still more distinct from the Papuan-Australian type than from that of the West-coast Negro. There is no supra-nasal ridge due to a sunken origin of the flattened nasal bones; neither the malar nor zygometric arches show the strength and prominence that mark them in the Australian male; there is no excessive size of molar or other teeth. From the present opportunity of studying the osteology and dentition of the Andermaner, the ethnologist derives as little indication, or ground of surmise, of the origin of the race in question, from an Australasian as from an African continent: and there is scarcely better evidence of his Malayan or Mongolian ancestry. Prof. Owen was not cognizant of any anatomical grounds for deriving the physical Andaman people from any existing continent. But in making these remarks he intended no encouragement to a belief that they originated in the locality to which they are now limited. Dr. Latham states that "their language shows them to belong to the same division with the Burmese of the opposite continent." These, however, show the average stature of the southern Asiatic men. And it would be as pure assumption to affirm that they had been derived from the Andamaners, as that these were degenerate descendants of the Burmese. Combined geological, geographical, and zoological researches have made us cognizant of the fact of the formation and destruction of continental tracts of land in the known course of the earth's period of existence. The Andaman Islands, like Java, Sumatra and Ceylon, may have been parts of some former extent of dry land, distinct from, and perhaps pre-existent to, that neighbouring and more northern continent which has been the scene of the elevation of the Himalayan range of mountains, in part,—perhaps a great part,—within the tertiary period. The Andamans are forty miles distant from the nearest islands — the Cocos — on their north, and seventy-two miles distant from the Nicobar Islands on their south. There is a mountain 2,400 feet in height, called "Saddle Peak," probably volcanic, on the main island; and there is a volcanic island in the vicinity, called "Barren Island," with an active volcano. The whole of the shores of the Andamans are skirted by continuous coral reefs. It is plain that the Andamans are the active seat of those causes that influence the change in the relations of land to sea. We should, doubtless, err, therefore, in any speculation on the origin of their population, if we were to assume that the Andamans were such as they now are when they received their first human inhabitants. The cardinal defect of speculators on the origin of the human species is, the assumption that the present geographical condition of the earth's surface is anterior to, or, at least, co-existent with, the origin of such species. The Monogenist, on that assumption, bent on tracing all human races from one source and one existent centre, exaggerates the application and value of casual remarks, to show, for example, that "the Australians are not a pure race, but hybrids between true negroes and a Malayan, or yellow race (see Quatrefages, 'Unité de l'Espèce Humaine,' 12mo., 1861, p. 133). And the Polygenist invokes a separate creation of each race for each existing continent, or island-home of such race. The Andamaners are, perhaps, the most primitive, or lowest in the scale of civilization of the human race. They have no tradition, and as had been before remarked, apparently no notion of their own origin. Finding in their bows and arrows, and their hand-nets, implements that answer for acquiring the principal articles of food which their locality yields, they have carried the inventive faculties no further. At best, they may have availed themselves of the wrecks during the last century or two of their insular existence to barb their arrows with iron instead of fish-bone, and to get from broken bottles such trenchant fragments as our oldest known Europeans obtained from broken flints. The animal appetites are gratified in the simplest animal fashion; there is no sense of nakedness, no sentiment of shame. The man choosing promiscuously for one or more years after puberty, then takes, or has assigned to him, a female who becomes his exclusive mate and servant, and the reason assigned for this monogamy is that, though she be restricted, he may continue to select from the unmarried females as before. The climate dispenses with the necessity of any other protection of the body than a paste of earth and oil. Any rudiment of a cincture relates solely to the convenience of the suspension of weapons or other portable objects. They are not cannibals. Implacably hostile to strangers, the Andamaners have made no advance in the few centuries during which their seas have been traversed by ships of higher races. Perhaps the sole change is that of the materials for weapons derived from casual wrecks, to which allusion had already been made. Enjoying, therefore, the merest animal life during those centuries, why, asked the author, may they not have so existed for thousands of years? The conditions of existence being such as they now enjoy, on what can the ethnologist found an idea of the limitation of the period during which the successive generations of Andamaners have continued so to exist? Antecedent generations of the race may have co-existed with the slow and gradual geological changes which have obliterated the place or continent of their primitive origin, whatever be the hypothesis adopted regarding it. In every essential of human physical character, the present Mincopie, or Andamaners, participate with their more gifted brethren; they approach the Orangs and Chimpanzees only in their diminutive stature; but this is associated with the well-balanced human proportions of trunk to limbs: they are, indeed, surpassed by the great Orangs and Gorillas in the size of the trunk and in the length and strength of the arms, in a greater degree than are the more advanced and taller races of mankind.

'A Letter from the Colonial Office, on the Exploration of N.W. Australia, under Mr. Gregory.'

'An Appeal on behalf of the only Son of the Great Traveller, the late T. Atkinson, Esq.,' by Sir R. I. Murchison.—Sir R. I. Murchison said that Eastern Siberia and the Great Steppes beyond it, were explored a few years ago by that remarkable and enterprising traveller, Thomas Atkinson, who once lived in Manchester, and had built one very good church here, and whose skill and taste as a landscape-painter were well known—who had directed his enterprise for a series of years to the exploration of those remarkable regions of Mongolia and the eastern steppes of the Kirghis. The volumes which he had published had been received with much approbation by the public, and had been read with much avidity; and he had thrown much light on tracks in which he might venture to assert not only no Englishman, but scarcely any European, had previously trod. He knew of no traveller that had penetrated where this remarkable man had been. In his travels he had a spirited wife, who accompanied him throughout; and, at the foot of one of those desolate mountains, the Alatau (in the Actau range, in the middle horde of the Kirghis, and near the celebrated spring Tamschiboulac), she gave birth to their only son, now twelve years old, who, by the lamented death of Mr. Atkinson, at Walmer, only a few weeks ago, was left in a state of want; for Mr. Atkinson did not travel at the expense of either the Russian or the British Government, but entirely at his own cost, and had expended his little means in his extraordinary journeys. It therefore occurred to him to make some appeal to the public in order to establish a fund to help on the education of that fine boy, who in commemoration of his having been born in such a remarkable spot, had been named Alatau Tamschiboulac Atkinson. They were of course exceedingly anxious that this young man, with so remarkable a geographical name, should in future life prove equal to his father; and in order to enable him to do so, the first thing was to give him a good education. Therefore was made this little appeal. Subscriptions would be received in London, at the rooms of the Royal Geographical Society, 15, Whitehall Place, and by the bankers of the Society, Messrs. Cocks & Biddulph, Charing Cross; and in Manchester by Dr. Shaw, the Secretary of the Geographical and Ethnological Society, as well as by the local treasurers of the British Association. — The following subscriptions were then announced:—Sir R. I. Murchison, 20*l.*; W. Fairbairn, Esq., 10*l.*; J. Craufurd, Esq., 5*l.*; C. White, Esq., 10*l.*; W. Spottiswoode, Esq., 5*l.*; and H. D. Seymour, Esq., M.P. 5*l.*

A Letter from Sir Hercules Robinson, Governor of Hong Kong, relating to the Progress of Major Sard, Capt. Blakiston, and others, who are endeavouring to pass from China to the North of India.

'On the Mountains forming the Eastern Side of the Basin of the Nile, and the Origin of the Designation "Mountains of the Moon" as applied to them,' by Dr. Beke.—This paper was in continuation of the author's communications to the British Association in the years 1846, 1848 and 1851. It commenced by stating that the great additions made to our geographical knowledge since the date of the author's previous communications have all tended to establish the substantial truth of the opinions therein expressed. In 1846 Dr. Beke described the Abessinian table-land as having its summit-line towards the sea-coast, and thence falling gradually towards the Nile; which river skirts the western flank of the high land, and is the sink into which all the rivers flowing over the table-land are received. The fall of the Nile is so small, that Dr. Beke estimated its absolute elevation in the fifth parallel of north latitude at not more than 2,000 feet. It is now found that at Gondókoro in 4° 44′ N. lat., the elevation of the bed of the Nile is only 1,911 feet. On the other hand, the mountain-range of Eastern Africa, forming the anticlinal axis between the ocean and the basin of the Nile, which in 1846 could only be traced as far as 9° 30′ N. lat., may now be regarded as extending beyond the sixth parallel of *south* latitude, in a line running from N.N.E. to S.S.W., between the 40th and 35th meridians. It was next stated that the Snowy Mountains, Kilimandjaro, Kenia and Doengo-Engai, which in 1846 were unknown, are portions of this mountain-range of Eastern Africa, to which Dr. Beke attributes the name of the "Mountains of the Moon," the snows of which are described by Ptolemy as flowing into the lakes of the Nile; the lakes intended being Nyanza and Tanganyika, recently discovered by Captains Burton and Speke. With reference to the derivation of the designation "Mountains of

the Moon" from the name of the country Unyamwezi, in the vicinity of those lakes, the author showed in the first place how the Indian name of the island of Java—Java-dvipe—was translated into Greek Κριθῆς νῆσος or *Barley Island*, just as the Latin name of the Etruscan city and port of Luna was translated Σελήνη; though there is reason for believing that such significations did not belong to the words *Java* and *Luna* in their respective aboriginal languages, but were merely mis-translations by the Indian conquerors of Java in the one case, and by the Romans in the other. In the same way, it was contended, the native African name Unyamwezi, having become known to the Greeks through the Sawáhilis, or people of the coast, in whose language *mwezi* means *moon*, was supposed to have some connexion with the name of that planet. Dr. Beke argued, however, that *Mwezi*, as a component part of the name Unyamwezi, does not necessarily mean *moon* in the aboriginal language of the country. All the Kafir tongues have certain prefixes, distinguishing singulars from plurals, adjectives from substantives, and one kind of substantive from another. Thus, Ki-Nyamwezi is the language spoken by the Wa-Nyamwezi people, who dwell in the country called U-Nyamwezi, one of those people, being a M'Nyamwezi or Mu-Nyamwezi, (whence our "Monomoezi"). Thus, it appears that the root is not *Mwezi*, but Nyamwezi; and though it may be that the natives themselves never use the root without some prefix, strangers might not unreasonably do so, and even contract Nyamwezi into Mwezi as the Sawáhilis and Arabs, according to Captain Burton, actually do; and from this contraction, the translation into the Greek *Selene* would have followed as a matter of course. What the theoretical root may mean in the Nyamwezi language has yet to be ascertained. Meanwhile the rendering of Unyamwezi into "Possession of the Moon," or "Land of the Moon" appears to be purely hypothetical. Should it prove to be erroneous, the designation "Mountains of *the Moon*," as applied to the great mountain-range of Eastern Africa, in which are the sources of the Nile, will have originated in a mistranslation. Still, that well-known name has been in use during so many ages, that it could hardly be practicable, and certainly would not be judicious, to supersede it now. The paper concluded thus:—"The entire eastern side of the basin of the Nile appears to be auriferous, the gold collected in various parts of it since the earliest ages, being brought down by the tributaries of that river, so that there is reason to consider the Mountains of the Moon as a meridional metalliferous cordillera, similar in its general character to the Ural and the corresponding mountain-ranges of America and Australia. Whenever the discovery shall be made in Eastern Africa of some of the chief deposits of that precious metal, the influx from all parts of the civilized world to the 'diggings,' in the Mountains of the *Moon* will be such as to occasion a more rapid and complete revolution in the social condition of those hitherto neglected regions, than could be caused by commerce, by missionary labours, by colonization, or by conquest; as we have witnessed in other parts of the globe, where the *auri sacra fames* has collected together masses of the most hardy and energetic of human beings. We shall then, too, doubtless see in Eastern Africa, as in California and in Australia, the formation of another new race of mankind."

'Notice of a Volcanic Eruption on the Coast of Abessinia,' by Dr. Beke.—During the night of the 7th or morning of the 8th of May, 1861, a volcano eruption took place from Djebel Dubbeh, in about 13° 57′ N. lat., and 41° 20′ E. long., accompanied by loud shocks resembling the discharge of artillery and immense clouds of dust. The noises were distinctly heard both at Massowah and at Perim, places nearly 400 miles apart, and the dust fell for several days over a vast extent of the Red Sea, and on the coast of Arabia as far as the mountain-range of Yemen. At Edd, on the Abessinian coast, a day's journey from Djebel Dubbeh, the dust was knee-deep, and its fall during the first day caused total darkness. The eruption continued at intervals for three or four days. There is no remembrance of any previous eruption. Djebel Dubbeh is distant about 230 miles, in a direction almost due north, from the great extinct volcano Aiyalu or Azalo, mentioned in Dr. Beke's paper 'On the Mountains forming the Eastern side of the Basin of the Nile,' and, like Aiyalu and also Kilimandjaro, it forms a portion of the mountain-system to which he attributes the designation of the Mountains of the Moon.

'Cromleachs and Rocking Stones considered Ethnologically,' by P. O'Callaghan.

'Remarks on the English Gipsies and their Dialects,' by C. Smart.

Section G.—Mechanical Science.

Saturday.

Dr. Eddy read 'A Proposal for a Class of Gunboats capable of engaging Armour-plated Ships at Sea, accompanied with Suggestions for fastening on Armour-Plates.' He considered that the monster iron-clad vessels which we and our neighbours were building might be successfully assailed by vessels of very inferior size specially designed for the purpose. The first essential condition of such vessels was superiority of speed, and so protected as to approach them without being crippled; and he believed that one such vessel with a couple of heavy guns might so harass a larger vessel as to paralyze her movements, and that two such vessels might even engage with advantage; and, if this was so, might not a flotilla of these small vessels advantageously engage a fleet of the large iron-plated ships? To obtain superior speed, we must either sacrifice weight of metal or increase the size. He preferred the former, and by reducing the armament to a very few guns—two or four,—and those of the powerful kind now manufactured, he thought we might obtain the required speed within moderate dimensions; and he hoped to show that, by a peculiar adjustment of material, we might gain all the protection required, without immoderate weight. Much of this problem had indeed been worked out by Capt. Coles, of whose cupola, the conical fort, with revolving shield, in the model produced, was a modification. A speed of sixteen knots an hour would, he believed, be sufficient for present purposes, and he took it that this speed might be secured without difficulty in a vessel of fine lines, and of certain proportions, without tremendous size. Dr. Eddy proceeded to describe from a model the kind of gunboat he proposed to build. The dimensions, he said, were calculated from one datum, namely, the least elevation above water at which the guns could advantageously be laid, which he took to be 8 feet. In this position, then, he would place two of the heaviest Armstrong guns, with their muzzles 4½ ft. apart, on an inclined slide, upon a turn-table placed within a fixed conical fort, armour clad, the sides of which sloped at an angle of 45°. Above this, for a perpendicular height of four feet, he would protect the guns and gunners with a shield of iron plate, also at an angle of 45°. The shape of the fort would be a truncated cone on a cylinder, like an extinguisher upon a candlestick. A second cupola he believed might be added, and this would give an armament of four guns, which, if concentrated upon one point at short range, must have a crushing effect. But, to be of any use, the smaller vessel must be enabled to approach her large antagonist without risk of having a shot sent through her bottom from the enemy's depressed guns. The manner in which he proposed to fortify the gunboat was by keeping all the vital parts well below the water-line, and covering them with a deck which would deflect upwards any shot that might reach it. As the boat was only intended to attack ships, not forts, he presumed there was no need to apprehend a shot striking her at a larger angle with the horizon than 7°. Still at this angle, to protect the sides of the vessel effectually, the armour must be carried at least 4 ft. above water and 3 ft. below, possibly more; but as this involved a weight of 300 tons in plating alone, some other method of protection must be sought. He hoped he had found this desideratum in a plan which aimed at carrying out thoroughly the principle of deflexion. His plan consisted of an arched deck of inch iron resting upon two courses of timber, the extremities of the arch being tied, so as to neutralize the outward thrust. He proposed that this should spring at the sides from three feet below the water-line, and that the crown should rise amidships up to the water-line, the crown being kept tolerably flat, the object being to present so small an angle that even a flat-headed bolt should glance off. The space above the deck and between it and the water-line he proposed to pack with some tough and resilient but light fibre, and these qualities he found combined in the cocoa-nut fibre, which could be easily rendered incombustible by sal-ammoniac. This fibre would offer a considerable amount of resistance to the penetration of a shot, and in proportion to the resistance would tend to deflect the shot. The exact amount of resistance which this mode of packing would afford could not be ascertained without experiment, but the trial would not be expensive. He might be met with the objection, that steel or iron was the substance which offered the greatest amount of protection proportionate to its weight. Granting this, he maintained that there were circumstances under which iron alone could not be advantageously used, and that this was one. Dr. Eddy alluded to the difficulty now felt in securing the iron plates on the sides of the vessels without weakening them by perforating holes, and he mentioned a plan of screwing the plates within a rail-shaped frame, which he said he had been encouraged by Mr. Fairbairn to lay before the Section, and which he thought would obviate the difficulty.

Capt. Blakely, R.A., then brought forward his paper 'On Artillery *versus* Armour.'—He said it was now four years since he first developed at Dublin his ideas with reference to the strength and extent of range which might be obtained with a particular description of cannon. He was happy to think that the principle he then contended for had since been recognized by both the English and Spanish Governments to be correct. With great deference to the opinion of Sir William Armstrong, he must state, as the result of his experiments, that nearly every kind of steel he had used was better than every kind of wrought iron. Cast iron, where weight was no objection, he found to answer admirably. Capt. Blakely exhibited the drawing of the new Spanish gun, and explained its construction. The diameter of the bore was between six and seven inches; more than half of the gun, he said, was of cast iron, the upper portion of the breech only being formed of rings of steel. Extensive experiments had been made to determine the proper degree of tension for these rings, because on that point depended the efficiency of the gun. If the rings were too tight, they burst before the central part, and if they were too loose the central parts burst first, and perhaps left the rings whole. He did not think that any limit could be assigned as to the size which would be reached in the manufacture of guns. The whole question of armour hung on the cannon which it had to resist. He had read that Sir William Armstrong was engaged in the manufacture of a 300 lb. gun. He (Capt. Blakely) was trying to make a 600 lb. gun, and by using wire he did not think there was any insurmountable difficulty in making a 6,000 lb. gun, or even a 60,000 lb. gun. He believed it could be done, and if it could be done anywhere it was in England. The construction he would propose was that to which Sir W. Armstrong alluded and approved of on the previous day, the coiling of steel wire round a central cylinder. With a 600 lb. gun of this construction the iron plates would have no chance.

The Chairman remarked that they had better confine their attention to the 200 lb. gun, which was all they had got at present.—Capt. Blakely admitted that with the 200 lb. gun the iron plates would have the best of it. He had offered over and over again to make a gun of the description he had named at his own expense and place it at the service of the Government for trial, and the offer had been refused. With all respect, he must remark that it was not philosophical for the Government to refuse his oft-repeated offer, and to go on building ships with the conviction that such guns could not be made. He, however, announced that since the last Meeting of the Association the Ordnance Select Committee had acknowledged the

correctness of his theory that in building up cannon each layer must have a definite strain; he therefore asked the Meeting to place some confidence in his assurance that guns could and would be made to smash any armour-plate which a ship could carry.

Mr. FAIRBAIRN, President of the Association, as one of the Committee (of which Sir J. D. Hay was chairman) appointed to conduct the experiments at Shoeburyness, gave some of the results of the experiments made. Apologizing for his not having been able to prepare a written report, he stated that one of the results of the experiments made was to convince him that, though we had very good iron in this country, yet he did not think that the quality of the wrought iron was quite so good as some produced in other countries. The iron itself was good, but it had not that uniformity of texture which was obtained in foreign countries. Our ironmasters, he believed, were bestowing attention on the subject, and in a short space of time would, he believed, be able to produce such plates as would have a fair chance of resisting such artillery as Sir William Armstrong's. It was the intention of the Committee to do everything they could to resist Sir William Armstrong, and he on his part would of course do everything he could to smash them up. In the case of armour-plated ships, it was not only necessary to have plates of sufficient thickness, but to have sufficient resistance behind to resist the deflexion caused by the shot. In the Warrior and the Black Prince wood was used for this purpose. His own opinion was, that wood was entirely unnecessary, and that every part of the vessel above the water line would be better of iron. Experiments had been made to test the velocity of the shot from the Armstrong gun, and it was found to be about 1,100 feet per second. Mr. Fairbairn referred to the necessity of securing toughness and homogeneousness in the plates, and also the desirability of securing a better mode of attachment than the present system of using bolts or screws. They had tried experiments with a target composed of iron bars; but they found that the resistance offered was not nearly so great as by the iron plates. The experiments would be continued, and in a few months the Committee hoped to arrive at a definite result with regard to the proper thickness of the plates, the mode of attachment, and the quality of the iron.

'On the Iron-cased Ships of the British Admiralty,' by E. J. REED.—He enumerated and described the vessels at present constructed; and stated that the construction of six other vessels had been determined upon, the contracts for three of this number having already been issued. It was important to observe that, notwithstanding the long delay on the part of the Admiralty before they commenced the construction of vessels of this class, the determination of Parliament to have a fleet of iron-cased ships had even now overtaken the Admiralty, and no experiments on a large scale had yet taken place. The great expense it would be necessary to incur to conduct target experiments on a large scale had probably much to do with the delay. A committee of eminent ship-builders had lately estimated that the cost of a target large enough to test half-a-dozen modes of construction would be no less than 45,000*l.*, and another 45,000*l.* would have to be expended in the construction of a floating hull on which to place the target. The three new ships in course of construction would be twenty feet longer than the Warrior, fifteen inches broader, 582 tons additional burthen, and 1,245 tons additional displacement; and as the displacement was the actual measure of the ship's size, they would thus be more than 1,000 tons larger than the Warrior. As the engines of the new vessels were only to be of the same power, their speed would probably be much less than that of the Warrior. This diminished speed was one of the penalties we must pay for clothing both extremities of the vessel with iron plates. Another penalty would probably be a great tendency to chop and plunge in a sea-way. The cost of these new vessels would exceed the cost of those of the Warrior class by 20,000*l.* or 30,000*l.* They would certainly be noble specimens of war ships. A vessel built throughout of iron 400 ft. long and nearly 60 ft. broad, enveloped from end to end in armour impervious to all shell and to nearly all shot, furnished with the most powerful ordnance, with ports 9 ft. 6 in. above the water-line, steaming at a rate of 12 or 13 knots an hour, would indeed prove a most formidable engine of destruction. If the present intentions of the Admiralty were carried out, we should have six of such vessels added to the Navy in the next year or two. In vessels of this kind all beautifying devices must be dispensed with. Their stems were to be upright, or nearly so, without that forward reach, the "knee of the head," which added so much to the beauty of the present vessels. Their sterns would also be upright, and as devoid of adornment as the bows. It should also be stated, as a distinguishing mark of these six ships, that their thick plate would not be extended to the bow at the upper part, but would stop at the junction with the transverse plated bulkhead, some little distance from the stem, and this bulkhead would rise to a sufficient height to prevent the spar deck from being raked by shot. They would be armed with fifty 100-pounder Armstrong guns, forty on the main deck and ten on the upper. It was not yet determined, he believed, whether these new ships were to be backed up with teak, as in the previous ships, or whether the plates should be 6½ inches thick, without wood. This would not be decided upon until after the termination of the experiments with the large targets suggested by the President and others. All that was yet definitely determined was, that whether the armour be made of iron alone or of iron and wood, its weight should be equal to iron plates 6½ inches thick. He now came to notice a very different class of vessels, of which the hull was mainly timber with armour plated upon it. The Royal Alfred, Royal Oak, Caledonia, Ocean and Triumph were all vessels of this class. Their length was to be 272 feet, breadth 58 feet, and displacement, 6,839 tons. Each would be fitted with engines of 1,000 horses' power. They were formed with timber originally designed for wooden line-of-battle ships, but had been lengthened 18 feet. The whole of these ships, it was believed, as well as the iron-plated ships, would match La Gloire in speed, provided they were fitted with the engines at first proposed. It was necessary to make this proviso, because there was a probability of smaller engines being put into some of them. He could not pretend to compare the French and English ships with each other in detail; but he might mention that a friend of his, who had just returned from France, had furnished him with the dimensions of the Solferino, one of the largest of the French iron-cased ships, as follows:—Length 282 feet, breadth 54 feet, draught of water 26 feet, burthen 6,820 tons. The vessel will be plated with 4½-inch plates, right fore and aft at the water-line, and over two decks amidships. With reference to the cost of iron-plated vessels, Mr. Reed said that, assuming the average cost of the ships to be 50*l.* per ton, and the engines 60*l.* per horse-power, then the eighteen ships which we were now building would cost about 4,700,000*l.*, and their engines above 1,150,000*l.*—together nearly 6,000,000*l.* sterling; and when masted, rigged and fully equipped, 8,000,000*l.* would have been expended upon them. He referred, in conclusion, to the extensive dock changes which this revolution in ship-building rendered necessary, and urged the serious importance of at once supplying increased dock accommodation in the South of England for these ships. He argued that whether in peace or in war such accommodation would be required; that it would be in the highest degree perilous longer to defer the establishment of colossal docks on the Southampton Water; and in some other favourable places. At present we had no docks fitted in all respects to receive such ships, whereas the French had many. Mr. Reed contrasted the English and French docks; and stated that it had been proposed to increase the French works by the establishment of an immense steam arsenal, protected by a series of impregnable fortresses at Lezardrieux.

A vote of thanks to the readers of the papers, proposed by the CHAIRMAN, was carried by acclamation.

Sir J. D. HAY rose, at the request of the President of the Association, to supplement his remarks on the Experiments at Shoeburyness with some observations of his own. The Committee, he said, in order to ascertain the best quality of material, the best thickness of metal, and the best mode of manufacturing iron plates, invited the leading manufacturers of the country to place before them specimens of iron plates which they considered best adapted for the purposes required. Plates, varying in thickness from ¼ inch to 10 inches were sent in. The Committee found on making experiments, that the steely description of metal, that was to say, metal which had been hardened, and went by the names of semi-steel, homogeneous iron, &c., up to a thickness of ¾ in., possessed great resisting powers, but after that thickness, this description of metal was not so well qualified to resist a blow of a projectile as wrought iron of the best kind. This having been ascertained, another law had been pointed out to them which they were not yet in a position fully to recognize. It was that the resistance of the plating increased with the square of its thickness. Thus, if the resistance of a plate one inch in thickness was equal to one, the resistance of a plate two inches in thickness would be four; four inches in thickness, 16; and six inches in thickness, 36. Considerable difficulty was felt in fastening the plates upon the sides of the vessels, as it was felt that all holes drilled in them were a source of weakness. Mr. Scott Russell had a plan of fastening the plates, which, perhaps, he would explain to the Meeting. Their great fear was not of a solid missile being driven through the ships' sides, but of the possible materials the shot might contain. They could scarcely hope effectually to exclude cold shot, but they did think it was possible so to construct a ship and so to plate it, that a hollow missile impinging upon its sides would be broken to pieces, and consequently they hoped to be able to exclude all shells, red-hot shot and shot filled with liquid iron, which were amongst the most terrible weapons of modern warfare. In the course of their experiments they had tried the effect of the shells upon an old brig, the Hussar. At the twelfth round the brig was on fire beyond the possibility of extinction. He thought it a misfortune that the stem and stern of the Warrior were not better protected—and the steering apparatus was placed in that part of the ship from which the missiles were scarcely excluded at all. He thought it a wise determination on the part of the Admiralty to convert the wooden line-of-battle ships laid down into armour-plated vessels of great size and speed. In the course of the Shoeburyness experiments they had found that at whatever angle the targets were placed the fracture made by the Armstrong gun was just as large, though it differed somewhat in shape, according to the angle. He could only account for this fact by supposing that the damage was done by the instantaneous concussion, and not by the shot boring or punching a hole through.

Mr. T. ASTON read a paper 'On Elongated Projectiles for Rifled Fire-arms.'—After alluding to the improvements that have been made in war projectiles, which have resulted in the elongated form, he proceeded to notice the advantages which it possesses over the old spherical shape. The elongated projectile, presenting to the resisting atmosphere a sectional area considerably less than the spherical of the same weight, is less retarded in its progress through the air. It follows, therefore, that although the spherical projectile with a similar charge of gunpowder is more easily set in motion, and has a greater initial velocity than the elongated form, and to that extent has at the outset an advantage, the elongated form is much better able to overcome the resistance of the atmosphere, and owing to its superiority of momentum preserves its progressive power for a much longer period,—at the same time it is less disturbed by the varying conditions of the elastic medium through which it is propelled. In short, it has a longer and truer flight. The essential condition to the efficiency of the long projectile is, that it shall move onwards with its point foremost; if it turns over in its path, it presents a large surface to the action of the air, its flight at once becomes irregular, and is rapidly retarded. The action of the common spinning-top suggests at once the idea that the best mode of

making the elongated projectile move steadily through the air with its point foremost is to give it rotation round its axis of progression. The rapid revolution of the body causes its inherent inequalities to be rapidly carried round a constant axis in regular order, and a kind of balance is thereby established, which gives the body a steady motion. Various plans have been from time to time tried with the object of imparting to long projectiles a steady flight; they have been made with spiral grooves cut externally on their periphery, or internally from front to rear, in the expectation that the resisting action of the atmosphere acting on the inclined surfaces would give the requisite spinning motion. Again, they have been made very long and furnished with fins or feathers, in order that they may be propelled on the principle of the arrow, but no practically successful results have as yet brought projectiles of this kind into use. The required object is, as is well known, readily and successfully effected by propelling the elongated projectile from a rifled barrel, that is, a tube having its interior made of such a spiral form that the projectile while it is propelled from the breech to the muzzle is turned round its axis of progression: a rotatory motion is thus imparted, which is retained by the advancing projectile and gives it the required steady motion. The elongated bullet was first used with rifled small-arms, either poly-grooved or fluted, or, like the Enfield, having three grooves. The length, however, was limited; and various attempts were made to fire longer projectiles compounded of various metals and of various shapes, so that by changing the position of the centre of gravity they might be propelled point foremost. But if made beyond a certain length they were always found to turn over at moderately long ranges. Mr. Whitworth was the first to enunciate the principle that projectiles of any requisite length could be successfully fixed by giving them rapid velocity of rotation, which should be increased in proportion with their increased length. He, as is well known, uses rifles having a spiral polygonal bore, in which all the interior surfaces are made effective as rifling surfaces. The success of the elongated projectile having been established in the case of small-arms, their employment with ordnance followed as a natural consequence. Rifled ordnance were, therefore, called into existence to meet the requirements of the time. In fact, the rifled cannon may be considered as a rifled musket made with enlarged proportions. Directing our attention more particularly to the two systems of Armstrong and Whitworth, we see in the former the coiled barrel and fluted bore formerly used for the rifled small-arm, applied on an enlarged scale. In the Whitworth cannon the same system and form of rifling are used which are employed for the Whitworth musket. There is, however, a change required for the projectiles; they cannot, like the small-arms bullets, be made of lead, for obvious reasons, such as the cost of the metal, its liability to distortion of form, and unsuitableness for shells. Sir William Armstrong uses a compound projectile, formed of an iron case surrounded with a leaden coating,—the rifling being effected by the force of the explosion in the barrel, which is thus partly expended in forcing the lead through the grooves. Mr. Whitworth uses a simple hard-metal projectile, made of the requisite shape to fit the rifled bore by machine labour in the manufactory, so that the whole force of the explosion is employed to propel the projectile. After giving a description of the two projectiles, and pointing out that the Armstrong projectile necessarily required a breech-loading cannon, and that the Whitworth is used at pleasure for muzzle-loading or breech-loading cannon, Mr. Aston proceeded to notice the external shape of the projectiles. The importance of giving to ships intended for high speed the shape best suited to facilitate their progress through water is now universally acknowledged; and Mr. Whitworth considered that it was necessary to ascertain, by reasoning upon similar grounds, and by experimental research, what was the proper shape to give to his projectile, so that it might be propelled through the air under conditions most favourable to precision and range. He, after numerous corroborating experiments, decided that the projectile of the form exhibited to the Meeting was the best. It has a taper front, having nearly the external section of what mathematicians term the solid of least resistance, the curve being somewhat rounded; the rear is made to taper in such proportion that the air displaced by the front is allowed readily to close in behind upon the inclined surfaces of the rear part. The middle part is left parallel to the required distance, to provide rifling surfaces and obviate windage. The results of long and repeated trials show that this form of projectile gives much greater precision and a superiority of range, varying from 15 to 25 and 30 per cent. (according to the elevation and consequent length of range), as compared with a projectile of the common rounded front and parallel rear end. At low elevations, where the range is comparatively short and the velocities great, the difference in the result of the taper and non-taper rear is not so marked as at the higher elevations, where the mean velocities of the projectiles are reduced. But at all ranges the superiority exists both in precision and velocity, as the elongated projectile at no practical range has a mean velocity so great as to prevent the atmosphere closing in behind it. One of the most important advantages attending the use of the taper rear is, that it gives a lower trajectory, which renders errors in judging distance of minor importance, as the projectile which skims along near to the ground is more likely to hit a mark, especially a moving one, than a projectile which, moving in a more curved path, has to drop, as it were, upon the object aimed at, whose distance therefore must be accurately guessed. The taper shape of the rear is peculiarly well adapted for the proper lubrication of the gun, which is most essential for good shooting. With the Whitworth gun a wad made wholly of lubricating material was introduced; it obviates the necessity of washing out the piece,—and the subsequent adoption of a similar wad for the Armstrong gun enabled that piece also to be used without washing out, which was at first necessary, and found to be a very inconvenient operation for a service gun. Various forms of elongated Whitworth projectiles suited for special purposes were described: tubular projectiles for cutting cores out of soft materials, as the sides of timber ships; flat-fronted hardened projectiles, first used by Whitworth and afterwards by Armstrong, for penetrating iron plates. It is found that these projectiles penetrate, when fixed point blank, through iron plates inclined at an angle of 57½°† to the perpendicular. The edge of the flat front, though slightly rounded, takes a hold, as it were, as soon as it touches the plate, and the resistance met is merely that due to the thickness of plate measured diagonally. Official experimental trials made on board the Excellent at Portsmouth showed that these projectiles penetrate readily through water, and would go through a ship's side below water-mark. The new American floating battery, which is submerged to protect her sides during action, would find no defence in that plan against these projectiles. Shell and shrapnel having the elongated form and taper rear were also described; and to show the suitableness of that form for ricochet firing, tables were read, from which it appears that the mean results of a series of six shots, making many ricochets within a range of 2,400 yards, gave the greatest mean deviation of about 75 yards from the straight line. In considering the probable result of the contest now going on between armour-plates and projectiles, it should be borne in mind that the limit of thickness of armour-plate that can be carried by ships will soon be reached, but that the power of destruction of projectiles may be without doubt increased far beyond what has hitherto been tried. It may, therefore, be reasonably anticipated that in this all-important contest the victory will ultimately rest on the side of the projectile.

Sir W. ARMSTRONG said that, with regard to the prospective size to be attained in the construction of artillery, he must confess he did not go so far as Capt. Blakely. It was quite true that he himself was engaged in the construction of a 300-pounder gun—and the experiment was already very considerably advanced, and so far with perfect success—but, at the same time, he must say he found the construction of even a 300-pounder gun on his principle a work of considerable difficulty, and he really would venture to suggest to Capt. Blakely that it would be better to obtain a 100-pounder or a 200-pounder before he ventured upon such a monster as he had mentioned. He agreed with Capt. Blakely that the hooping of a cast-iron gun with wrought iron gave it great resisting power; but he differed with Capt. Blakely in thinking that such mathematical nicety was required in the construction. Provided only care were taken to allow sufficient shrinkage, the hoops would adapt themselves to that amount of tension which would give the maximum resisting force of the gun, and before the hoops would give way the gun would have passed through the phase of greatest resistance. He entirely agreed with Mr. Fairbairn as to the desirability of adopting the form of structure for plated ships which should obviate the use of wood. He attached great importance to this plan, because by adopting it much unnecessary wood would be got rid of, and the iron plates could therefore be thickened, but chiefly because by this means the liability of part of the ship rotting, and their having to pull it to pieces periodically to set it to rights again, was done away with. His opinions on the subject of iron-plated ships had been so often made known that it would be mere repetition for him to go over the ground again. The only new point he had to bring before them was, that in the construction of those ships they must chiefly keep in view their adaptation for a small number of monster guns. There had been a feeling among naval men that guns above a certain weight—five tons, he believed—could not be practically managed on board ship. Lately, however, their ideas had been considerably enlarged, and they now went as far as 7½ tons, which would be about equal to one of his 200-pounders. He believed that guns of a much larger size could be managed, but to do so of course they would have to avail themselves of machinery. Mr. Aston had explained the Whitworth projectile and had called attention to what he considered its various merits. He had also alluded to his (Sir Wm. Armstrong's), which lay on the table before them. Upon this subject let them talk as long as they liked, Mr. Aston and himself would never come to an agreement. He believed that his own projectile would inflict a greater amount of damage than the other. He thought something more was required than the punching process of the flat-headed shot. Let the effects be tried. Let a target be erected representing an object such as would be used in actual war, and then let experiments be made to see which missile would inflict the largest amount of injury. He had no doubt whatever that for punching a hole in iron plating the flat-headed bolt invented by Mr. Whitworth was the form, if made of steel. But he apprehended that the object to be attained was not only to punch a hole in the side of an armour-plated ship, but to inflict so much damage as to disable her. What he wanted to effect was to be able to hurl a large mass, no matter what form, against the vessel, so as to crush in her side, and he believed that this could be done by the use of guns of a large size. In the Whitworth projectile, the rotary motion was given by the shape of the bolt. In his own ordnance the projectile was covered with a soft material, and so took the direction of the grooves. There might be advantage in both plans; but he did claim for his own this superiority, that there was less necessity for precision in the manufacture, and little fear of injury to the bolt. He had lately been making experiments with a large kind of projectile, one of which he had before him—[a huge mass of metal, weighing some cwt.]. In this projectile, instead of having a soft metal all round it, it was confined to three ribs, which would take the impression of the grooves. It was designed for a gun called the "shunt gun," the construction of which, not having a diagram with him, he could not explain. —Mr. J. SCOTT RUSSELL said, there were one or two general considerations of this subject which he thought, if laid before the Meeting, would save a

† Sir J. D. Hay subsequently confirmed Mr. Aston's remarks in this respect, and said that Whitworth flat-fronted shot fired from an Armstrong gun (for the Armour-Plates Committee) had penetrated plates inclined at an angle of 80° to the perpendicular.

good deal of misapprehension. If they would just set out by believing that we should never get perfect impenetrability, many schemes, with the answers to them, would be put out of the way. The whole practical part was incorporated in one expression of a great sailor, "Whatever you do, for God's sake, keep out the shells." Having been in vessels fired at, and having been behind iron targets fired at, he was in a position to say that he could stand behind iron plating with a wonderful degree of comfort. You were sure the shells would be kept out, and if two or three holes were punched in the side of the ship by the large shot neither you nor the vessel were much the worse for it. But if Sir William Armstrong should be able to do as he had just said, to bring large masses to bear upon the sides of these iron-plated ships, then this was another mode of destruction quite as injurious as destruction by shells would be. The whole question then resolved itself into these two things:—Keep out the shells, and prevent Sir William Armstrong driving in the sides. The ship-building question at the present time involved the very difficult problem, how to build a ship with an enormous weight in the place where good ship-builders generally contrived to keep out all weight. The first vessels were loaded with 1,000 tons, the new vessels would have 1,500 tons, and this weight was not only a great inconvenience, but a great injury to the sides of the ship. As the ships were now built, the plating in no way contributed to the strength of the ship; he was anxious to see the ship built entirely of iron, in which case the iron plating might contribute to the strength. What he wanted to know was, how much in the construction of these large ships the builders might be allowed to appropriate of 9 in. of iron to be used partly in armour, and partly in the construction of the ship? The question they now asked the Iron-Plates Committee, and which he believed Mr. Fairbairn's experiments would settle in a very short and decisive manner, was, how much of this iron could be used in the construction of the ship, and how much must be used in armour-plating outside? Take it that there were eight inches of plating allowed. If the Committee would be content with a 2-inch plate, and a 1-inch plate on the outside, leaving the builders five inches to be used in the sides of the ship, he was prepared to say that this would be an enormous advantage. He would even meet them further, and give them four inches to be used for the armour, leaving him four inches to be used in the construction of the ship. But the Committee might insist upon having a 5-inch plate to go to the bad, leaving him only three inches for the ship, and he would still endeavour to build the ship to suit these conditions. There was another point upon which the builders were at issue with the Committee. The Committee say they will not have holes in these iron plates, and the builders reply that, so far as they knew at present, the Committee must have holes. Sir J. D. Hay had asked him to lay before the Section a plan which he had submitted to the Admiralty so long ago as 1854. He would bring up between the plates a piece of soft malleable iron. This he would heat in its place after the plates were on, so as to make a round-headed rivet all round the edges of the plates, which could thus be firmly attached. This plan, if successful, would obviate the necessity of perforating the plates; but allow him to say that he did not believe in his own opinion until tried, for there was scarcely a theory promulgated but was knocked down by those Armstrong and Whitworth guns—and at the present moment he had not a single theory to set up. The Warrior had been built without armour on her extreme ends, and he (Mr. Scott Russell) had some of the blame or the merit of that arrangement—which it was remained to be seen. But yet he would take very little credit on that point, for this reason, that when the dimensions and the required speed of a vessel were settled, the question as to whether she should bear armour from end to end was determined beforehand by the very conditions of the problem. Referring to Mr. Aston's paper, Mr. Russell entered into calculations to show why he did not attach much importance to the tapering form of the Whitworth projectile. He believed that in proportion as the velocity of the projectile was less than its critical velocity, which he believed was about 1,100 feet per second (the very velocity which the Committee had ascertained was the velocity of the Whitworth projectile), in that proportion only might some advantage be derived from distinction of shape. The case of the projectile and the ship differed in this, that the one had attained its critical velocity and the other had not, hence this difference in his opinion with regard to the value of form. In the ship it was of value, but in regard to the projectile which had attained its critical velocity, length and fine taper would have no effect. But this was one of the subjects upon which no wise man would dogmatize, but would be grateful to any one who would institute experiments.—Admiral Sir E. BELCHER considered that the suggestion of Dr. Eddy, for constructing small vessels to compete with the iron-cased frigates, had been met by Mr. Scott Russell's observations on the incompatibility of weight and speed without dimensions. The height of the large vessel would enable her so to depress her guns that the smaller boat would present an angle of about 60°, instead of the angle stated. The curved deck of the proposed gunboat involved the necessity of its being rendered bomb-proof, and that entailed iron plating equal to the plating of a frigate. The fibre suggested for the packing would be peculiarly liable to smoulder or to burn, and the salt with which it was proposed to render it incombustible would corrode the iron so rapidly that, in the course of a few months, the vessel would be useless. It had occurred to him that, instead of the iron plates being backed up with wood, iron ribs, placed transversely, something in the gridiron fashion, at intervals from each other less than the diameter of the shot, and the interstices filled up with wooden material, would be a better mode of resistance. By the present system of laying the iron plates, if one were injured when the vessel was abroad, it would be impossible to replace it, perhaps for months or even years. Therefore he thought it would have been better if Mr. Scott Russell had followed out his plan of sliding the plates in from the water-line upwards, because if one of the lower plates happened to get injured, it could be removed, and the other plates could be slid down to fill up the vacant space, and a new plate could be put in at the top without difficulty. After the battle of Algiers, it was his duty to clean out the captain's cabin. He was surprised to find that a ream of foolscap, which had been struck by a large shot, had simply been crimped up. In 1854, he applied for leave to build a battery of compressed brown paper, and he believed that this material, which was one of the most powerful repellants of shot, might be advantageously used. Sir E. Belcher alluded to the force with which even wooden ships could charge and split icebergs, and expressed his decided opinion, that if the weight of the Warrior struck La Gloire across the bows the latter must inevitably go down. He himself, if hard put to it, should have no objection to have a try at La Gloire in one of the old wooden ships—and he thought he saw some of his naval friends around him who would say the same. He complained that the peculiar construction of the new vessels would deprive them of the pleasure of running down an enemy, which was a point upon which naval men prided themselves.—The Rev. Dr. ROBINSON (Dean of Armagh) said the paper which had been read by Mr. Reed could hardly be rated too highly, and he hoped a recommendation would proceed from that Section that it should be printed in the *Transactions*. In the course of an interesting address, Dr. Robinson traced the invention of armour-plates to Lord Rosse; and whilst paying a high tribute to the splendid mechanical genius of Mr. Whitworth, he pointed out that both the elongated projectile and the beautiful system of polygonal rifling were inventions dating much further back than his time. He himself had seen a rifle on the polygonal principle made two centuries before Mr. Whitworth was born.—Mr. FAIRBAIRN, in allusion to the remarks of Mr. Scott Russell as to the possibility of using a number of single inch plates, instead of one solid plate, stated that the experiments had shown that one 2-inch plate was equal to three or four 1-inch laminated plates. He quite agreed with Admiral Belcher as to the form of the bows of the Warrior. His own opinion was that they should have been curved downwards instead of projecting below.

FINE ARTS

FINE-ART GOSSIP.—A new effort in decoration appears in the statues, in terra-cotta, representing Strength, Temperance, Justice and Truth, presented by the Prince Consort to the Horticultural Society, and erected at South Kensington. We hope much from the application of this material to garden statuary. It has seldom been employed in England, for some strange reason,—in a country which may be said to have the greatest facilities for its manufacture. In ancient Rome terra-cotta was commonly enough employed, and not less so in mediæval Italy. The works in question are placed at the sides of the entrance of the Maze. Two of Rauch's noble 'Victorys' are added also. These are 9 feet high, in bronze, and were designed for the late King of Prussia. We believe that these are to be seen amongst the magnificent series of casts from the works of the great Prussian sculptor, which are, with regret be it said, almost unnoticed at the Crystal Palace.

The medal designed by Mr. Maclise for the prize-holders of the 1862 Exhibition, like that of 1851, is to be of bronze, and of the same size as its prototype. The engraver is now producing the dies for it. On the obverse appears Britannia seated on a throne, holding in her right hand a wreath and in her left an olive-branch. Figures representing Raw Produce—the native material unwrought by man, Machinery—the method of man's labour, and Manufacture—the result of that labour, are exhibiting to Britannia their several attributes. Figures representing the Arts, Painting, Sculpture, and Architecture stand behind, as attendants upon Britannia. By a very sensible decision, the Commissioners have resolved not to award medals, or other rewards, to the producers of works of Art:—therefore, the emblems of their professions are seen more as spectators than as interested parties in the decision of the principal figure. Resting before the feet of Britannia, and occupying the whole front of the composition, is placed the British Lion himself.

The number of exhibitors from the other side of the Channel to the forthcoming gathering at South Kensington is far beyond what it was in 1851. 4,425 manufacturers from France have applied for space up to the present time. In 1851 there were but 1,700 French exhibitors in London, and but 2,500 English exhibitors at the Paris Exposition in 1855. French artists (architects, sculptors, painters and engravers) are informed by the *Moniteur* that *bulletins* of inscription, to be filled up by them, may be had at the Palais d'Industrie, and that all applications for admissions into the section of the *Beaux-Arts* must be sent in to the Imperial Commission before the 1st prox. Those of our readers who are interested in this are informed that previously-made applications by artists before the printed *bulletins* were issued, not being in the form prescribed, must be repeated in a more correct manner.

A new School of Art was opened at Hull, on the 11th inst., in connexion with the Department of Science and Art. Fifty students commenced their studies on the evening of that day. Classes for ladies are held every Monday and Thursday morning, from 9·30 to 1·30. Several ladies have already entered these classes, both in the elementary and advanced stages of instruction. A very large collection of casts and examples has been purchased by the Committee, so that every facility now exists for the study and practice of the Fine Arts in Hull, under precisely the system and rules which exist at South Kensington.

A statement of the restorations made in the Cathedral at Hereford has been put forward by the Dean and Chapter, from which it appears that, of the sums borrowed on mortgage (13,000*l.*) under the Hereford Cathedral Restoration Act, from 1859

to 1861, 10,000*l.* has been expended on the internal and external restoration of the north transept and aisles, the south transept, the north aisle of the choir, including Bishop Sainsbury's Chapel, the north-east transept, the south-east transept, the south aisle of the choir, the Chapter House and vestibule, the Ladye Chapel and vestibule, and Bishop Audley's Chapel, and the external restoration of the north aisle of the nave, the north porch, the south aisle of the nave and the great cloisters. They have, therefore, 3,000*l.* in hand to meet the balance of existing contracts and the cost of flooring generally (except the choir), repairing and refixing monuments, re-leading part of the roof, repairs of inner stonework, &c. The following additional works are proposed to be executed if funds can be raised for the purpose:—Fitting-up and flooring of the choir, restoration of the external stonework of the tower, lighting the Cathedral for congregational use, and fitting-up the Ladye Chapel for service for St. John's parish. These works are estimated to cost 8,000*l.*; towards which the Dean and Chapter have in hand and promised a sum of 3,553*l.* 10*s.* 10*d.*, leaving 4,446*l.* 9*s.* 2*d.* to be provided. They, therefore, appeal to the public for pecuniary aid, and state that, if the funds were forthcoming, the whole of the works in the interior might be completed, and the Cathedral opened in October of next year.

A Russian Church, for the performance of the Greek rite, was inaugurated on the 11th instant, in the new Boulevard leading from the Arc de Triomphe to the Park of Monceaux, Paris. The edifice greatly resembles the Greek Church at Wiesbaden.

An English Church, of granite, has been recently erected at Chamouni, on the left of the path leading to the Montanvert, and removed a short distance from the town.

MUSIC AND THE DRAMA

MADAME LIND-GOLDSCHMIDT.—EXETER HALL.—Mendelssohn's Oratorio of ELIJAH.—TUESDAY EVENING, October 22.—Under the distinguished patronage of Her Royal Highness the Duchess of Cambridge, Her Royal Highness the Princess Mary of Cambridge, Duke and Duchess of Marlborough, Duchess of Argyll, Duchess of Inverness, Marchioness Townshend, Marchioness of Northampton, Marchioness of Cholmondeley, Maria Marchioness of Ailesbury, Marchioness of Westminster, Dowager Countess of Essex, Countess Poulett, Countess of Portarlington, Countess of Harewood, Earl and Countess De Grey, Countess Vane, Countess of Leicester, Countess of Ellesmere, Earl and Countess Russell, Viscountess Sydney, Viscountess Palmerston, Viscountess Jocelyn, Viscountess Enfield, Lady Sandys, Lady Eburry, Lady Blantyre, Lord and Lady Rokeby, Lady Stanley of Alderley, the Baroness De Rothschild, Right Hon. Wm. Cowper, Hon. Mrs. Cowper, Hon. Mrs. Wellesley, Lady Filmer, Lady Peto, Mrs. Tait (Fulham Palace), Mrs. Odams, Mrs. Bettis, Mrs. G. R. Birt, Mrs. Brassey, Mrs. H. A. Bruce, Mrs. Capper, Mrs. R. Ferguson, Mrs. G. G. Glynn, Mrs. Henry Kingscote, Mrs. Coleridge Kennard, Mrs. Morrison, Miss Morrison, Mrs. Arthur Otway, Mrs. Pelly, Mrs. L. M. Rate, Mrs. Sartoris.—MADAME LIND-GOLDSCHMIDT having generously given her services in aid of the Funds for the completion of a Church, and for the enlargement of the Industrial Institutions in the Victoria Docks district, "London over the Border," under the pastoral care of the Rev. Herman Douglas, the acting Committee have great pleasure in announcing that there will be a Performance in Exeter Hall of Mendelssohn's Oratorio, ELIJAH, on TUESDAY EVENING, October 22, the principal parts by Madame Lind-Goldschmidt, Miss Palmer, Mr. Sims Reeves, and Mr. W. Weiss, assisted by a complete Orchestra and Chorus. Conductor, Mr. Otto Goldschmidt.—Reserved and Numbered Seats, 1*l.* 1*s.*; Unreserved Seats and West Gallery, 10*s.* 6*d.*; Back Area, 7*s.* Reserved Seats will be appropriated according to the order of application; and no more tickets will be issued than can be conveniently accommodated.—Applications for tickets to be made at Mr. Mitchell's Royal Library, 33, Old Bond Street; Messrs. Addison & Co. 210, Regent Street; and at the principal Libraries and Musicsellers.

LAST WEEK BUT TWO of ALFRED MELLON'S PROMENADE CONCERTS, THEATRE ROYAL, COVENT GARDEN. Grand Orchestra.—Mdlle. Florence Lancia, Madame Laura Baxter, Mr. Weiss, and Mr. Vernon Rigby, Every Evening.—On Monday, an English Night, on which occasion a New Waltz, by Alfred Mellon, The Ariel, and a New Quadrille, The Dibdin, on Nautical Airs, by C. Coote, will be performed; on Tuesday next, a Mozart Night; on Wednesday, a French Night; on Thursday, a Mendelssohn Night; on Friday, an Italian Night; and on Saturday, a Volunteer Night. Commence at Eight. Promenade, One Shilling.—Conductor, Mr. Alfred Mellon.

On September 30, Mr. EDWIN BOOTH, Son of the late celebrated Junius Booth, will make his FIRST APPEARANCE in England, at the THEATRE ROYAL, HAYMARKET, in the character of Shylock, in 'The Merchant of Venice.'

MUSIC IN MADRID.

IT is no scandal to assert, that whatever may have been the amount contributed by the land in times past to the world's stock of Art, Spain has, to-day, no place of her own in the empire of European music. A guitar-player or two,—a few *seguidillas*, *modinhas*, and national dance tunes, in which the smallest amount of variety or novelty is to be found,—make up the story of her offerings, so far as we know it in England and France. Still, wherever there is civilized speech, there will be music, more or less in quantity, home or foreign in quality, let the season be what it will,—music, too, deriving some particularity from the framework in which it is set. A note or two of what has been heard during a few weeks of autumn holiday in Spain may not be without interest.

Down the road from Pamplona, reached in early morning, to Madrid, arrived at four-and-twenty hours later, there was no sound of pipe, or wire, or human voice, save such as ourselves made. The silence of the fierce, scorched, herbless, hilly desert, as lonely and unpeopled as though the land was accursed, was unbroken by the sight or sound of bird or other living creature. In those picturesque halting-places, Agreda and Soria, which displayed the only habitations to be seen during the weary day, not a note was to be caught as we toiled on, under "a heaven of brass" and amid a simoom of dust. Sound there was—in the perpetual cries with which the trustworthy driver of the diligence urged his team of ten forward, and which, mixed with the tuneless jingle of the mule bells, are not yet out of my ears. Anything more doleful and discordant in outcry and accompaniment hardly exists, even in the Pandemoniacal shrieks and gibberish ventured by M. Berlioz in his 'Faust.' Never was a showy and brilliant capital (and Madrid is both) approached so dolefully, with such meagre preface or promise in its surroundings.

The Englishman cannot take ten steps from his hotel without being excited by the sight of some characteristic figure or group, which converts familiar pictures into realities. Who does not know the lady in her mantilla and fan,—the bull-fighter, with his quaintly-dressed hair, tasselled cap and sash,—the clean-limbed and clean-linened peasant, unlading his handsome ass,—the mason, taking his *siesta* in the comfortable dust, with one of the stones he has been chiselling for his pillow,—as so many old acquaintances? Yet, in Madrid, they surprise one almost as much as if Wilkie and Lewis and Phillip had not brought them home to us. And a surprise is the swarming Prado, seen by moonlight, with its crowds of graceful pedestrians and admirably turned-out equipages,—and its children going round in dancing-rings under the spare acacia trees,—and its clean water-sellers. Surely, one might listen there for guitar and castanet,—for something, whether national or exotic, not unreasonably. But we only encountered a gnat-like accordion, an asthmatic old barrel-organ, and a harper, who did his best, on the worst of harps, to represent the well-worn 'Miserere' from 'Il Trovatore.' (This, by the way, is a setting of a ferocious modern Spanish romance; hence, possibly, its extreme popularity here.) Lights in the Church of San José directed us as we were strolling homewards to a scene not less full of picture and peculiarity—the funeral of a lady, on whose obsequies much ghastly luxury had been lavished. The building was hung with black draperies laced with gold; an enormous pyramidical catafalque before the high altar blazed with candles, tier above tier; all too few to light up the groups, kneeling or lounging about in attitudes ready made for the painter. There was an orchestral Mass, which, I fancy, may have been of modern Spanish manufacture. More characterless music could not well be, nor any performed in an inferior fashion. But the chanting was good—by male voices, sonorous, and well in tune; and in the quartett of *solo* voices a *baritone* and a *contralto*, both of fair quality, were to be remarked.

The following evening yielded a thoroughly national exhibition in an old guitar-player, perched on the edge of the kennel in the Puerta del Sol. Street-music could not have a better background than the wide fountain, with its ample sheaf of deliciously cool water, rising in a floating film against the darkness, with the folk who congregate on its brim to gossip or to fill their jars. The guitar-work was of itself the real thing: first, a series of ingenious changes, rung on a theme as short as the *Ciaconna* glossed by Sebastian Bach, with all manner of odd effects, such as I only recollect to have heard from Señor Huerta,—afterwards, a graceful *Notturno*, in ¾ *tempo*, less characteristic, but still unfamiliar. We have since come upon more than one guitar going a-roving at night-fall, or touched by mendicant beggar at the church-doors, but have heard nothing so good as this. Another evening hour, whiled away in a shabby public garden, so ill lit with its Chinese lanterns that its haggard, dusty look passed unreproved under the cloud of night, introduced us to a slow dance, the "Habanera," neither very graceful nor very decorous, in ¾ *tempo*, which was new in style, but too sickly and lackadaisical, both as to music and motion, not to become wearisome after the first five minutes.

I have inquired for "the where" and "the when" of church-music without the slightest success. It is strange that in a capital so steeped in Roman Catholicism as this the Church should make so little show. Not one building for sacred uses attracts the eye, save it be the Gothic Church of San Geronimo, standing behind the incomparable Picture Gallery, and now (by the way) under restoration. They tell me that little or no service-music, good, bad or indifferent, is to be heard, save in the Royal Chapel when the Court is in the capital. Vespers in the choir of the grave church in the Escorial were as badly executed, when I heard them, as certain Roman vespers which occur to recollection as the *ne plus ultra* of abomination. The player who disported there on one of the four gilt organs, a powerful instrument with a fierce and thrilling tone, was incompetent and offensive in his flourishing vulgarities. Yet what a scene for solemn music is that august chapel, especially for those who have visited the pompous tomb-house of Spanish kings beneath the high altar, and cannot help feeling as if somewhat of the haughty and arrogant spirit of the monarch who raised the enormous pile, even unto this day, haunts its massively arched corridors and cleaves to its granite door-posts! The Escorial Church would be the place of places in which to hear Cherubini's 'Requiem'! A characteristic *funcion* was to be seen on Sunday morning, the 1st, in the Church of Jesus of Nazareth, part, it was advertised, of a jubilee service. Hard by the portal of this church is a chapel, with its altar-piece of life-sized coloured sculpture, where the Virgin, flying into Egypt, wears a flapping straw-hat, and the Child another. Within the rails, an *Organ Alexandre* and a double-bass did duty for orchestra; without them, four men (deacons or choristers) sang a gay mass stoutly and coarsely, but in tune and with accent, with voices not unpleasant, though little cultivated. The execution was as rudely primitive as that of a village service,—strange to meet within fifty yards of the *Prado* in gay Madrid!

The above paragraphs make up little more than a catalogue of negatives. But no one who has taken pains to gather testimony and recollect facts could feel disappointed at so paltry a gleaning, especially when the time of year is considered. Ere we left Madrid, however, the Comic Opera, or Zarzuela Theatre, opened for its season. Here may such musical creative life as the capital possesses be found. The company is made up of Spanish artists; and though one may (as one might in Germany) fall on versions of known operas by Hérold, MM. Flotow and Auber, and other light foreign composers, the repertory is also fed by native writers unknown on our side of the Pyrenees, such as—to name merely those who are promised for the season just begun—Señors Gaztambide, Barbieri, Arrieta, Vasquez, Oudrid, Fernandez Caballero. A benefit concert afforded us the opportunity of hearing some of the singers and a few specimens of the modern national composers of Spain. That times have changed since Ford's 'Handbook' was written, and that, as a guide, the work is out of date, so far as the present aspect of Madrid is concerned, is not to be denied. The theatre of which he gives so menacing a description is now a spacious, gaily decorated, comfortable building, agreeable to inhabit, easy to see and hear in, one of those available places of amusement which, it seems, we are never to have in London. The stage appointments and dresses are neat, picturesque and liberal; as was to be seen in a concert where every piece was sung with change of scene and in costume. The orchestra was not good (it may

have been a benefit orchestra); the solo singers were more than agreeable. A *seconda donna*, Señora Rivas (with a charming *soprano* voice), a mature *soubrette* (who manœuvred her fan and her many skirts to admiration),—a tenor whose organ is sympathetic, and whose method is good,—and a baritone full of animation and spirit, must have surprised those who have been little used to hear of, or to hear, the singers of Spain. If these artists be of average quality, the country has materials for comic opera superior to those commanded at the time present by Germany and Italy. Four artists better trained for their duties are rarely to be met with. A *prima donna* "of other days" who was more ambitious, pleased us less; but her vocal style was, like theirs, good. The chorus was lively and ready. The music chosen, principally short and popular pieces from Spanish comic operas, bore out this pleasant impression. A duett from 'Gil Blas,' by Señor Manzochi (*quære* a naturalized Italian?) was given by Señor Sanz (the tenor), and Señor Obregon (the baritone mentioned), with so much spirit, that, being itself very piquant and national, an *encore* was resistless. I have not heard anything so genial, or better executed, for many a day. In short, this might prove a world worth looking into. A glance at the score of two comic operas, 'Catalina,' in three acts, and 'Una Vieja,' in one, by Señor Gaztambide, has revealed traces of a vein of nationality which could be worked to good account by a composer more assured in his science and varied in his resources. Both contain pretty music, though the writer is timid in combination and trite in modulation; both are as welcome (after their Spanish kind) as the better known 'Czaar und Zimmermann' of Lortzing, or the 'Stradella' of M. von Flotow. The public appears to enjoy this theatre, since on the first night of the regular opera season not a seat was to be obtained save at a premium. It is a public, too, whose courteous manners, self-respect in point of appearance, and quick pleasure in all that passes, add no little to the satisfaction and cheerfulness of the solitary stranger.

The Italian Opera at Madrid is this winter to be headed by Mesdames de La Grange and Julienne Dejean, with M. Carrion for principal tenor, and Signor Giraldoni, baritone; not one of the above is Italian by birth. What a tale is here told! But a new chapter seems to be opening in the story of Southern art. If Italian opera be going down, Italian drama may be rising. The walls of Madrid announce the performances in tragedy and comedy during coming months of a company led by Signora Santoni, the Marchesa Zambeccari, whom the papers assure the patrons of plays is as great an actress, both in grave and gay parts, as Signora Ristori. C.

SADLER'S WELLS.—The revival of the Second Part of 'King Henry the Fourth,' on Saturday, calls for special remark. It is now some years ago that this chronicle-play was put up for a few nights as a mere curiosity; but, as now performed, it claims notice as an acting drama. It goes so smoothly and safely in the grooves that it is, we think, likely to gain a permanent occupation of the boards. Truly, the drama in question is a worthy member of an epic series that breathes with the very national life of England, and almost demonstrates with a living certainty the reason wherefore she has attained her conspicuous greatness among the nations. First of all, we have here true men and women, robust and vigorous, though rude and vicious, with all the elements of progressive action in them. They revel, indeed, in exuberant health, and overflow with humour and self-will. There is a determination of character that individualizes each, and manifests a spirit of independence, which is the soul of enterprise and success. Observe, too, out of how small a germ the dramatic action is made to grow. News of the death of Hotspur, the death of Henry the Fourth, and the coronation of Henry the Fifth make up all the drama has of plot; yet what a world of interest the Poet has educed from it by merely grafting on it an extensive, or rather intensive, characterization! We have said the play is part of an epic series. That series consists of the two parts of 'Henry the Fourth,' and the play of 'Henry the Fifth.' The series is valuable on account of the vast amount of poet-work in their composition; for Shakspeare seems mainly to have trusted to himself in writing them, and to have taken the events direct from Holinshed without resorting to any other dramatist for aid. Every available hint of the historian in relation to character has been eagerly seized by the poet. Henry the Fourth himself is remarkable for dignity, prudence, moderation, and teaches us at once by what means he redeemed, in his latter days, the objectionable traits of his early conduct. Scroop, the Archbishop of York, is also transferred from the historian's page to the dramatist's canvas with accuracy and elegance. The following lines have their origin in a passage of Holinshed:—

> But now the bishop
> Turns insurrection to religion:
> Supposed sincere and holy in his thoughts,
> He's followed both with body and with mind;
> And doth enlarge his rising with the blood
> Of fair King Richard, 'scaped from Pomfret stones:
> Derives from Heaven his quarrel and his cause;
> Tells them he doth bestride a bleeding land,
> Gasping for life under great Bolingbroke,
> And more and less do flock to follow him.

—For the companions of the Prince and Falstaff, Shakspeare is somewhat indebted to an older play; but he has thrown the light of his imagination on his predecessor's dullness. Falstaff loses nothing of his importance in this Second Part; and we have, indeed, a new feature in Doll Tearsheet. One might have thought that the scene in which this troll is introduced was scarcely presentable on the stage; but its actual performance dissipates all such notions. We see at once the difference between coarseness and immorality, and accept the former as a necessary shade in an historical picture, as well as fitly illustrating the manners of the time. The humour of it moves, indeed, the audience to extravagant mirth; but it is wholesome foolery for all that. It is a laugh that does the spectator good. The poet's management of the young Prince himself is so delicate that it is scarcely possible to do justice to the exquisite art displayed; but, happily, it is so generally appreciated that it were superfluous to do more than allude to the fact. The interviews between the royal father and the censurable Prince of Wales are among the most remarkable dialogues in Shakspeare. These scenes were most carefully rehearsed by Mr. Phelps and his son. The *Falstaff* of Mr. Barrett is highly praiseworthy; and many of the numerous characters are accurately sketched by the various performers. But the great feature of the revival is the manager's impersonation of *Justice Shallow*, which for individuality and senile astuteness, pretence ending in mere fatuity, is one of the most characteristic things on the modern stage. It is that, indeed, which has given its popularity to this revival, and will, we doubt not, preserve a place for it on the Islington boards so long as Mr. Phelps retains the management of the theatre. We need not add, that the performance commands full houses.

STRAND.—Under the title of 'A Lucky Escape'—a version of the French *vaudeville* 'La Baronne de Blegnac'—has been placed on these boards; Mr. C. S. Cheltnam being the adapter. The burden of the little piece lies on Miss Marie Wilton, who disguises herself as the Baroness to escape the attention of a French regiment in a garrison town, and who is toasted by a bashful lover in response to the descriptions of his brother officers, who are eloquent in the lady's praise without having seen her. When he finds that the lady to whom he stands engaged is an old woman, with green spectacles, the Chevalier is wofully disconcerted; but the removal of the disguise terminates his perplexity. Mr. Belford was amusing in his embarrassment; and Miss Wilton gave force to the character of the heroine. All, in fact, depends on the actors, the dramatists having supplied them with but slight materials for embodiment.

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